



GSM-R user procedures (cab radio)

Procedures for using the Siemens GSM-R cab radio (Version 2)

Issue 6.3
June 2012

Content approved by:

Gary Portsmouth
Lead Operations Specialist

A handwritten signature in black ink, appearing to read 'Gary Portsmouth'.

Copyright in the Railway Group Standards is owned by Rail Safety and Standards Board Limited. All rights are hereby reserved. No Railway Group Standard (in whole or in part) may be reproduced, stored in a retrieval system, or transmitted, in any form or means, without the prior written permission of Rail Safety and Standards Board Limited, or as expressly permitted by law.

RSSB Members are granted copyright licence in accordance with the Constitution Agreement relating to Rail Safety and Standards Board Limited.

In circumstances where Rail Safety and Standards Board Limited has granted a particular person or organisation permission to copy extracts from Railway Group Standards, Rail Safety and Standards Board Limited accepts no responsibility for, and excludes all liability in connection with, the use of such extracts, or any claims arising therefrom. This disclaimer applies to all forms of media in which extracts from Railway Group Standards may be reproduced.

Published by

RSSB

Block 2 Angel Square

1 Torrens Street

London EC1V 1NY

© Copyright 2012

Rail Safety and Standards Board Limited

Reference: **NS-GSM-R-OPS-0514**

Contents

Section	Description	Page
Contents	2	
List of tables	6	
List of figures	6	
Issue status	7	
General information		7
1	Introduction	8
1.1	Purpose of this manual	8
1.2	Abbreviations	8
1.3	Definitions	9
2	The GSM-R systems	11
2.1	Network features	11
2.2	GSM-R call types	13
2.3	Point-to-Point calls	13
2.3.1	Normal Point-to-Point calls	13
2.3.2	Urgent point-to-point call	13
2.3.3	Broadcast call	13
2.3.4	Railway emergency group call	14
2.3.5	On-board communication	14
2.3.6	Public address announcement	14
2.4	Operational text messages	14
2.5	Call routing	15
2.6	Call priorities	15
2.7	Call waiting and call hold	16
2.8	Identifying who is making the call or who is being called	16
2.9	Call divert	16
3	GSM-R system users	17
3.1	User equipment	17
3.1.1	Fixed terminal equipment	17
3.1.2	On-train equipment	18
4	Where GSM-R works	19
4.1	Identifying GSM-R areas	19
4.2	Changing between different radio systems	19
4.3	Registration aliases	20
4.4	Areas not supported by signalling-system based call routing	20
4.4.1	Call signaller button	21
4.4.2	Urgent point-to-point calls (yellow button)	21
4.4.3	Standing at signal operational text message	21
5	Overview of the GSM-R cab radio	22
5.1	Cab radio buttons and what they do	23
5.2	GSM-R cab radio display-screen layouts	24

GSM-R user procedures (cab radio Version 2)

5.2.1	Normal-mode layout	24
5.2.2	Menu display layout	24
5.2.3	List-display layout	25
5.2.4	Shunting-mode layout	25
5.2.5	GSM-R cab radio menu structure and how to use it	25
6	Entering service	29
6.1	Preparing the cab radio	29
6.1.1	Traction unit power on	29
6.1.2	Switching on the cab radio display unit (using your driver's key)	29
6.1.3	If the cab radio is already registered when switched on	30
6.1.4	User adjustable cab radio settings	31
6.1.5	Adjusting the brightness of the cab radio	32
6.2	Cab radio registration	32
6.2.1	Train reporting number (Headcode)	33
The TRN, is provided by your company, normally printed on your 'driver's diagram' (or equivalent).		33
6.2.2	Location Code	33
6.2.3	Registering with the driver's key on	34
6.2.4	Pre-registering the cab radio	35
6.3	Deregistering the cab radio	36
6.3.1	Deregister the cab radio (end of journey)	36
6.3.2	Deregister the cab radio (start new journey)	37
6.4	Keeping registration	38
6.5	One-touch communication buttons	38
6.5.1	Call signaller button	38
6.5.2	Urgent priority point-to-point call button	38
6.5.3	Railway-Emergency Group call button	38
6.5.4	Accidental use of the railway emergency group call button	38
6.6	Using phonebooks	39
6.6.1	Phonebook dialling	39
6.6.2	Using the Network Rail phonebook	39
6.6.3	Using the train operator phonebook	39
6.7	Keypad dialling	39
7	Using the cab radio to communicate	41
7.1	Receiving a call	41
7.1.1	Receiving a point-to-point call	41
7.1.2	Receiving an urgent point-to-point call	42
7.1.3	Receiving a railway emergency group call	42
7.1.4	Receiving a general broadcast call	45
7.2	Receiving operational text messages	46
7.2.1	'Contact signaller' message	46
7.2.2	'Contact Train Operator' control message	46
7.3	Making calls	46

GSM-R user procedures (cab radio Version 2)

7.3.1	Point-to-Point call to signaller	46
7.3.2	Unable to connect a call	47
7.3.3	Calling a signal box that has closed	48
7.3.4	Calling a signal box or panel where the role is being managed by another signaller	48
7.3.5	Urgent point-to-point call	48
7.3.6	Railway emergency group call	49
7.3.7	Accidental use of the railway emergency group call	51
7.3.8	Emergency (999/112) call	51
7.3.9	Electrical Control Operator (ECO)	51
7.3.10	Operations Controller	52
7.3.11	Driver to driver communication	52
7.4	Handling several calls (call holding, call waiting, call pre-emption)	59
7.4.1	Putting a point-to-point call on hold	59
7.4.2	Another party putting you on hold	59
7.4.3	Reconnecting a held call	61
7.4.4	Swapping between an active call and a held call	61
7.4.5	New incoming call	61
7.4.6	Answering a waiting call	61
7.5	Sending operational text messages	62
7.5.1	Standing at signal	62
7.5.2	DSD alarm message	63
8	Shunting mode	65
8.1	Introduction	65
9	Trouble-shooting guide	66
9.1	Losing the main power supply (back-up battery arrangements)	66
9.2	If the radio does not power up correctly	67
9.2.1	Power-up self-test failures	67
9.2.2	Service-affecting failures	67
9.2.3	Non-service-affecting faults	67
9.2.4	Start up failure of Drivers Control Panel (DCP)	67
9.2.5	Cancelling fault messages	67
9.2.6	If the cab radio does not find the network	68
9.2.7	The radio connects to the wrong network	68
9.2.8	Cab radio displays foreign language	68
9.3	Registration problems	69
9.3.1	Registration failure	69
9.3.2	Cab radio failed to de-register from previous journey	69
9.3.3	PA registration failure	69
9.3.4	Wrong train reporting number displayed	70
9.3.5	Duplicate registration identity	70
9.3.6	Pending registration (trying to register if there is no coverage)	70
9.3.7	Loss of registration	71
9.3.8	Failure of the cab radio to de-register	71
9.3.9	Failure of the Public Address to de-register	71
9.4	Temporary loss of coverage	72
9.4.1	No Network message	72
9.5	Loss of signalling-system based call routing	72
9.6	Call failure and dropped calls	73
9.7	Checking if the radio can make and receive calls (echo call test)	73
9.8	Manually testing the cab radio (maintenance tests)	73
9.8.1	Using the test button	73
9.8.2	Tests available through the menu	74
9.9	Call divert accidentally left on	80

List of tables

Table 1 - Types of GSM-R calls	13
Table 2 – Cab radio buttons and what they do	23
Table 3 – GSM-R Cab radio menu structure	28
Table 4 – GSM-R cab radio error messages	87

List of figures

Figure 1 – GSM-R system overview	12
Figure 2 – GSM-R fixed terminal	18
Figure 3 – The GSM-R cab radio, handset and cradle	18
Figure 4 – Start of GSM-R area	19
Figure 5 – End of GSM-R area	19
Figure 6 – Example GSM-R alias plate	20
Figure 7 – Example signal-box phone number plate	20
Figure 8 – Example signal-box 12nn short code plate	21

Issue status

Version	Status	Date
1	Issued for ORG review	September 2006
2	Incorporating comments from ORG and further development	May 2007
3	Further updates following operational testing and ORG review.	September 2007
4	Updated to reflect version 1D cab radio software	December 2008
4 A	Change bar added to highlight changes for 1D update	January 2009
5	Amended to reflect lessons learnt from the Strathclyde Trial and Cab Mobile software version 1e changes.	January 2011
6	Updated to reflect version 2 cab radio software	November 2011
6.1	Updated to correct identified anomalies	December 2011
6.2	Updated to include updated information and to reflect introduction of rule change regarding radio emergency group call	June 2012
6.3	Updated with comments from May Operations Group review	June 2012

Amended or additional parts of revised pages have been marked by a vertical black line in the adjacent margin.

General information

Each Railway Group member is reminded of the need to consider its own responsibilities to ensure health and safety at work and its own duties under health and safety legislation. RSSB does not warrant that compliance with all or any documents published by RSSB is sufficient in itself to ensure safe systems of work or operation or to satisfy such responsibilities or duties.

RSSB members wishing to use the information contained in this document as the basis for further work are strongly advised to contact RSSB for current information on status, further guidance and the possibility of additional support.

Uncontrolled copies of this document may be obtained from the Head of New Systems, RSSB Block 2 Angel Square, 1 Torrens Street, London EC1V 1NY.

1 Introduction

A new digital radio communications system is being introduced to the railways of Great Britain. This uses a version of GSM (global system for mobile communications) - the system used by mobile-phone companies.

The GSM-R system has been specifically developed for European rail companies. It is based on European standards and specifications. The idea is to make sure trains can travel freely from one country to another.

For the railways of Great Britain this means that, for the first time, there will be one national system of secure communication for drivers and signallers with thorough coverage of the rail network including deep cuttings and tunnels.

1.1 Purpose of this manual

This manual explains how the Siemens GSM-R cab radio works and how it should be used.

1.2 Abbreviations

BSC	Base station controller
BTS	Base station transceiver
CSR	Cab secure radio
DO	Driver only
DSD	Driver's safety device
ECO	Electrical control operator
ECR	Electrical control room
GB	Great Britain
GSM	Global system for mobile communications
GSM-R	Global system for mobile communications – railways
MSC	Mobile switching centre
NRN	National radio network
OTDR	On-train data recorder
PA	Public address
PTT	Press to talk
SG	Standing at signal
SIM	Subscriber identity module
TOC	Train Operating Company
TRN	Train Reporting Number (Headcode)

1.3 Definitions

Call routing	<p>Cell-based call routing:</p> <p>A way of making calls to people who are registered based on where the caller is, for example, calls will be routed to the nominated signaller, operations controller or ECO. Cell-based routing uses information based on which cell the caller is within the GSM-R network to route the call.</p> <p>Signalling system-based call routing:</p> <p>Signalling system-based call routing uses information taken from the signalling system to improve the location information (where a call comes from) provided by GSM-R to provide accurate call routing. This means that a call to a signaller is always routed to the correct signaller for that location (signal).</p>
Cell	<p>The area covered by a single GSM-R base station including any associated repeaters.</p>
Driver-only	<p>A train that is worked only by a driver and does not have a guard.</p>
Group call area	<p>A predefined cluster of cells, which are set within the GSM-R network and normally consisting of three cells. This ensures that any group call initiated can be heard in the cell of origin and any adjoining cell.</p> <p>The type of group call will determine who will receive the call, for example, a railway emergency group call will be received by all cab radio users within the group call area, including any that may enter the area once the call has been established.</p> <p>Fixed terminal users will also be included in the group call, for example, at least one:</p> <ul style="list-style-type: none">• signaller.• operations controller. <p>However, because of the geographical area that most fixed terminal users control it will be normal for them to be associated with several group call areas.</p>
Train Reporting Number	<p>This four character number (number, letter, number, number), commonly termed "Headcode," is used for railway systems, publications and communication. A train reporting number may be used for more than one train on the network at any time, included in the same signaller's area of control.</p>

GSM-R user procedures (cab radio Version 2)

Lead driver	The lead driver has lead responsibility in conversations with other drivers registered on the same train. Communication with anyone else concerning the movement of the train will normally be handled by the lead driver.
Nominated signaller	If a call or operational text message is directed to the signaller where 'cell-based call routing' is in operation, the call will be directed to a nominated signaller chosen by Network Rail to receive that call, who may not be the correct signaller who controls the area from which the call was originated.
Priority and pre-emption	In GSM-R the different types of call are given a level of priority which is used to make sure that operational and emergency calls are not blocked by lower-priority calls.
Registration Code	Normally a seven-digit number which includes the four-digit train reporting number and a three-digit location code (the signal number, the number shown on an alias plate or an area specific 99X number). <i>(When setting up driver to driver communications the Registration Code consists of a five digit code + three-digit location code.)</i>
Secure radio system	A radio system that identifies where the train is or the train reporting number when used by a driver calling a signaller (or a signaller calling a driver). The system allows instructions on operational movement to be passed between the signaller and driver without other signallers or drivers hearing the communication.
Subscriber identity module (SIM)	SIM is part of the network which gives identity to the radio managed and controlled by the infrastructure controller. SIM, though part of the network, is actually mounted in the cab radio.

2 The GSM-R systems

GSM-R is based on the same technology that is used for public GSM (mobile phone) networks. However there are some extras added for railways.

The GSM-R system is made up of a network of radio base stations installed at the side of the track at regular intervals (about every five or six kilometres depending on the local environment and so on). These provide radio coverage for the cab radio and people using the GSM-R mobile system. This coverage includes tunnels as extra equipment, known as a repeater or leaky feeder, is provided to make sure that there is always network coverage. The coverage associated with an individual base station and its related repeater or repeaters is known as a cell.

Base stations are linked together in groups and connected to a central call-routing switch, the mobile switching centre (MSC) – Figure 1. This MSC confirms that users are authorised to use the system, connects calls between system users, and provides access to other networks if allowed. The MSC also receives information from other systems such as the signalling system (in areas where this is available). This provides an accurate source of train location information that the MSC uses to route calls to the appropriate signaller (or controller).

A GSM-R cab radio is provided in each driving cab for use by competent members of train crew who are authorised, for example, drivers. GSM-R fixed terminals are provided for use by signallers, operations controllers and electrical control operators.

2.1 Network features

The GSM-R system introduces a number of services and benefits to the user. The services provided include:

- Point-to-point calls.
- Pre-defined operational text messages, for specific situations.
- Broadcast calls.
- Emergency group calls.

The system can also:

- Route calls automatically from a registered cab radio.
- Automatically changes channels.
- Provide call waiting.
- Allow calls to be put on hold.
- Identify who is calling or being called.
- Allow more than one person to use the system.
- Prioritise calls.

GSM-R user procedures (cab radio Version 2)

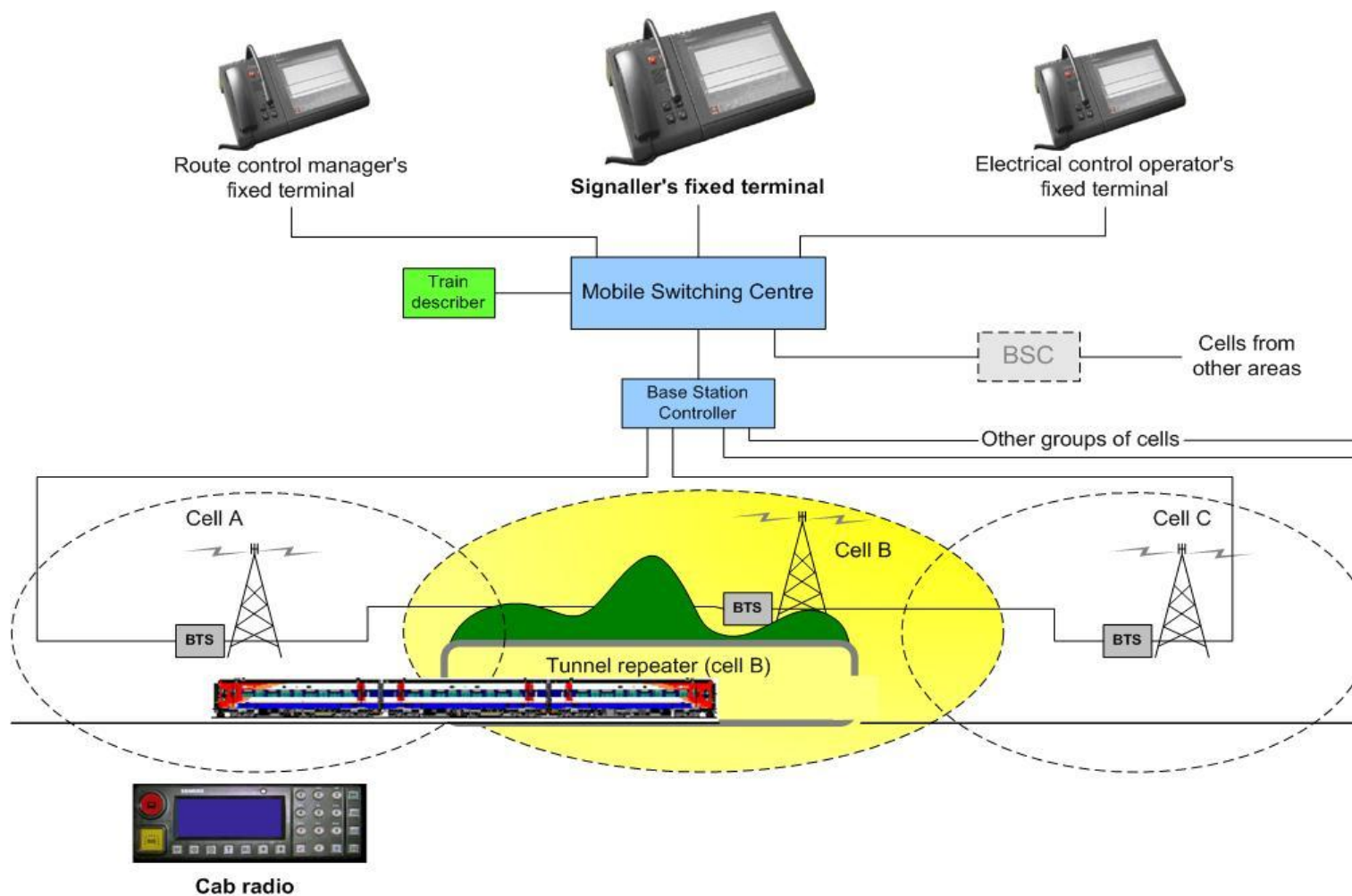


Figure 1 – GSM-R system overview

2.2 GSM-R call types

There are two generic types of call in GSM-R - point-to-point calls and group calls. Within each of these types of call there are a number of variants as listed in Table 1. Generally, in the case of the cab radio, taking part in a group call involves using the press to talk (PTT) button to speak to the other people involved in the conversation whereas taking part in a point-to-point call does not. Fixed terminal users (in other words, the signaller, operations controller or ECO) must use the PTT for all types of call.

A point-to-point call is a call between two people (like a normal telephone call) where one person dials another and both people can speak at the same time. The call will continue until either person ends it.

A group call will be connected to everyone in the specific GSM-R area that the call was aimed at. The group call allows only one cab radio user in the group to talk at any time (managed by the PTT button on the handset). However, those using fixed terminals who are involved in the call can override this and may talk at any time. A user will leave the call when they leave the group call area (for example, a train crossing the boundary of the last cell in the group-call area will leave the call) or when the call is ended.

Point-to-point calls	Group calls
Standard point-to-point call	Railway emergency group call
Urgent point-to-point call	Shunting group call
Public address call (Received only)	Shunting emergency group call
Berth triggered broadcast call (Received only)	Broadcast area call (Received only)

Table 1 - Types of GSM-R calls

2.3 Point-to-Point calls

2.3.1 Normal Point-to-Point calls

A conventional phone call between two people as described above.

2.3.2 Urgent point-to-point call

The network will give an urgent point-to-point call a higher priority than the normal one. When the call is made from the cab radio, this type of call only goes to the signaller. It should be used if a driver becomes aware of an incident that the signaller needs to know about immediately, but which does not mean all other trains in the area have to be stopped. The signaller can also make an urgent point-to-point call to a specific train in the event of an urgent situation and verbally request the train to stop.

2.3.3 Broadcast call

A broadcast call is a one-way announcement from the signaller (or operations controller) to all GSM-R cab radios in a pre-defined area. Broadcast calls are normally pre-recorded for automatic broadcast at previously determined intervals or locations.

① Fixed terminal users have the ability to make live broadcast calls.

GSM-R user procedures (cab radio Version 2)

The signaller (or operations controller) will announce, at the beginning of the recording, that the message is a broadcast call and will ensure that the end of the recording is clearly identified. This will make late entrants or those leaving the pre-defined broadcast area aware that they have received only part of the broadcast call.

The cab radio automatically answers broadcast calls and speech is relayed through the loudspeaker. Those receiving a broadcast call only have to listen to the broadcast, and take the relevant information that is likely to affect their train or prove useful to other members of staff or passengers on the train.

2.3.4 Railway emergency group call

The network will give a railway emergency group call the highest priority. Someone using a cab radio or a fixed terminal may make a railway emergency group call.

Once an emergency group call begins all GSM-R users within a certain area will automatically be connected to the call. The call can only be ended by the person who made it or someone using a fixed terminal.

2.3.5 On-board communication

This function allows onboard members of staff to use the GSM-R equipment to communicate directly with each other providing that they have a GSM-R cab radio and have registered their function or role.

2.3.6 Public address announcement

This allows the signaller to make a call over a train's public address (PA) system. This is necessary on all driver only (DO) passenger services.

The signaller can use this function if a driver's safety device (DSD) alarm is received. They can ask any railway staff travelling on the train to contact the driver.

2.4 Operational text messages

A number of operational text messages have been developed to improve communications between drivers, signallers and controllers.

From the fixed terminal the signaller can send:

- Contact signaller.
- Wait (in response to a standing at signal message from the cab radio).

From the cab radio the driver can send:

- Standing at signal (SG).
- A DSD alarm sent automatically by the cab radio if the driver becomes incapacitated or fails to reset the vigilance device

From the fixed terminal the TOC controller can send:

- Contact xxxxxxx Control.

2.5 Call routing

The GSM-R network uses a series of base stations located alongside the railway to provide radio coverage. The coverage associated with each base station is commonly known as a cell area.

In most instances each cell will have only one signaller. In these instances the GSM-R network can route any calls or operational text messages sent from a cab radio to the correct signaller.

However in some instances, there will be more than one signaller controlling train movements within the same GSM-R cell area, for example, where responsibility transfers from one signal box (or panel) to another. In these areas the GSM-R network will not be able to tell the difference between signallers and will need extra information to allow it to route calls to the correct signaller for the train making the call.

The GSM-R network will gather this extra information from the signalling system, using the train's last reported position stored in the signalling system, to route the call. This is known as signalling system-based call routing.

On routes where signalling system-based call routing is not provided, the GSM-R network will route any calls or operational text messages sent from a cab radio to a '*Nominated Signaller*'. This person may not be the signaller who controls the area for that train. At certain signals on these routes, GSM-R signal box phone number plates will be provided to show the driver that they must contact the signaller who controls the area by dialling the GSM-R fixed terminal phone number (see 4.4) or short code '12nn' number shown on the sign, instead of using the standing at signal message or call signaller button.

- ① Signal box GSM-R fixed terminal telephone numbers will be published in the Weekly Operating Notice (WON) and are also held in the cab radio Network Rail telephone book.

In addition, at those signals/locations identified above, urgent point-to-point calls made using the yellow button will be routed to a '*Nominated Signaller*', who may or may not be the signaller who controls the area. The '*Nominated Signaller*' will take any immediate actions required before telling the signaller who controls the area to contact the driver concerned.

- ① To prevent vital caller identity information being lost the '*Nominated Signaller*' is not permitted to forward your call to the signaller who controls the area.

2.6 Call priorities

The GSM-R network, as with any mobile phone network, has a limit to how many calls it can take. With this in mind, the system will prioritise different types of calls. For example, emergency or urgent calls will be connected, possibly at the expense of normal operational calls.

- ① If your call is automatically terminated due to a higher priority call being received by the person to whom you are talking, you will not receive any prior warning but you will see "Terminating" displayed on the screen.

GSM-R user procedures (cab radio Version 2)

The person with '*Lead Responsibility*' will be responsible for re-establishing communication, for example, in the case of a communication involving a signaller and driver, the signaller would be responsible for re-establishing the communication.

If you are not the person with '*Lead Responsibility*', then you must wait to be contacted by the person with '*Lead Responsibility*'.

2.7 Call waiting and call hold

If someone using a cab radio is already involved in a call of an equal or higher priority, they will be alerted to the incoming call and may:

- ignore the incoming call and continue with the call (the incoming call will be rejected after a set time, or the caller will hang up).
- end the ongoing call which will automatically connect the incoming call. or
- place the ongoing call on hold (telling the other party that they will be put on hold) and accept the incoming call. Once the second call is answered the user may swap between both calls. A call will remain on hold until the second call has been ended, at which point the call on hold will be automatically re-connected (it is important that the driver announces to the other party that the call is being re-continued).

2.8 Identifying who is making the call or who is being called

The identity of the caller and the called party will be shown on the cab radio display. The form that this takes depends on the information that is available to the cab radio at the time. For example, if an outgoing call is made by pressing the call signaller button, the cab radio will look up the number of the signaller that the call is routed to (from the Network Rail phone book) and display the listed signaller's name (for example, Glasgow Panel 1).

- ① The identity of the called party will be displayed once the call is connected and either a corresponding entry is stored within the cab radio's phonebook or the fixed terminal sends its identity to the cab radio.

Similar information is shown on the fixed terminal in the form of a train's TRN (assuming the cab radio has been registered) or the stock number of the traction unit (if it has not been registered). The train's last reported position stored within the signalling system is also shown or, if this is not available, the name of the cell area is shown.

2.9 Call divert

Call divert provides the option of forwarding incoming calls to another number. However, this function must not be used as there is currently no operational requirement for it.

3 GSM-R system users

The main purpose of GSM-R is to provide secure communications between train drivers and signallers. However, the following people are also likely to use the system:

- Signal box supervisors.
- Network Rail operations controllers.
- Electrical control operators (ECO).
- Train operator controllers.
- Guards.
- Other on-train staff.
- Shunters.
- Trackside workers.

The GSM-R system should be used only in line with instructions shown in GE/RT8000, Rule Book.

3.1 User equipment

3.1.1 Fixed terminal equipment

Signal boxes, Network Rail operations control offices and electrical control rooms have GSM-R fixed terminals, allowing calls and text messaging, connected to the MSC through the Network Rail fixed telecommunications network. In some signal boxes the signal box supervisor will also have a fixed terminal.

The fixed terminal gives the signaller and controller a list of all the users registered in the signaller's controlling area. Each registered cab radio will be identified by the TRN. The fixed terminal includes a handset for normal two-way voice communications plus a PTT button, a loudspeaker and display.

If you use a fixed terminal you will need to use the PTT for all types of calls. If you use a cab radio, you will use the PTT for group calls only.

- ① Signallers and controllers have the facility to override a cab mobile user and interrupt if required. This is likely to occur when a cab mobile user has finished speaking but has not released the PTT on the handset to allow other to speak.

When this facility is used, the cab mobile user will hear their speech played back to them in the form of an echo (commonly termed "Talker echo"). This is not apparent to the fixed terminal user whose only indication may be the cab mobile user having difficulty in completing their communication.

Strict adherence to voice protocols will stop this event happening accidentally (ie wait for the sender to complete their message before responding and release the PTT when finished talking).

GSM-R user procedures (cab radio Version 2)



Figure 2 – GSM-R fixed terminal

3.1.2 On-train equipment

The GSM-R equipment installed in the driving cab includes a cab radio assembly, user interface, handset and cradle, cab loudspeaker, roof-mounted antenna and associated cabling. The cab radio may also have its own battery to maintain power in case the normal power supply is interrupted.

The separate user interface (display unit) has a display and push buttons and is linked to a handset and loudspeaker.

The handset, including the speaker, the microphone and the PTT button, sits in a cradle which the driver can reach easily.



Figure 3 – The GSM-R cab radio, handset and cradle

4 Where GSM-R works

The aim is that GSM-R should cover the whole of the rail network in Great Britain including tunnels and cuttings. The network will be introduced in stages over a number of years. As a result, it will be extended over a period of time. The network will be provided on a route-by-route basis, it is therefore likely that there will be gaps in coverage until the network has been fully rolled out.

4.1 Identifying GSM-R areas

The beginning and end points of GSM-R operational areas are identified using the following signs.

The sign shown opposite (Figure 4) shows the start of a GSM-R radio section and potential changeover point from cab secure radio (CSR) or national radio network (NRN) radio to GSM-R.

When a train passes one of these signs, the driver must check that the GSM-R radio is working registered and connected to the GSM-R GB network.



Figure 4 – Start of GSM-R area

The top half of the sign shown opposite (Figure 5) shows the end of a GSM-R radio section. When reaching the end of a GSM-R section, drivers will have to change to another radio system, for example NRN. To help with the changeover from GSM-R to NRN or CSR, the NRN or CSR code is also displayed on the lower half of the sign.



Figure 5 – End of GSM-R area

4.2 Changing between different radio systems

Drivers can change from GSM-R to NRN while the train is moving, as long as they can do it safely and without causing distraction.

Drivers must not change from GSM-R to CSR while a train is moving, as they need to pay more attention to this process.

Drivers can change from CSR or NRN to GSM-R on the move when the GSM-R cab radio has been pre-registered (see section 6.2.4), the driver must confirm that the cab radio has

GSM-R user procedures (cab radio Version 2)

registered with the GSM-R network at the changeover point so that it is on the signaller's fixed terminal list of trains and mobiles.

- ① When operating in an IVRS radio area, and where authorised, the GSM-R cab radio can be used for communication in place of the IVRS handset.

When changing between radios, it is essential that the driver checks the operational status of the radio.

It may be possible for you to receive calls on both radio systems, if they are switched on. However, if for any reason you become confused about the information being received, you must seek clarification, stopping your train immediately if necessary, for example, emergency calls received on both radio systems.

- ① When changing from GSM-R if you do not intend to use GSM-R later in the journey, you must de-register the cab radio from the network before losing network coverage (see section 6.4).

4.3 Registration aliases

In places where there is no signal or where there may be confusion over the number to enter when registering the cab radio, an alias plate will be provided, see Figure 6.

You must use the 3-digit number shown on the alias plate and not the signal number at these locations.



Figure 6 – Example GSM-R alias plate

4.4 Areas not supported by signalling-system based call routing

At certain signals the GSM-R network may not be able to automatically route calls from the driver to the signaller who controls the area. In these areas the driver must call the signaller either by dialling the signaller's GSM-R phone number using the keypad, or by using the phonebook. A sign (Figure 7) will be provided, displaying the correct signaller's GSM-R phone number, to remind drivers about this.



Figure 7 – Example signal-box phone number plate

An alternative method has been developed to avoid a driver having to dial the long form 8-digit number. This is achieved by dialling a short code 12nn (the value of 'nn' will be allocated on a location specific basis to allow the call to be directed to the correct signaller). A sign (see Figure 8) will be provided on affected signals displaying the correct signaller's GSM-R short code number, to tell drivers about this.



Figure 8 – Example signal-box 12nn short code plate

It is important to understand that the following functions will be affected at signals plated with either a CT7 or 12nn sign:

4.4.1 Call signaller button

You must not use the 'call signaller' button, as the GSM-R network cannot be relied upon to route the call to the correct signaller.

4.4.2 Urgent point-to-point calls (yellow button)

Drivers using the 'yellow button' to make an urgent point-to-point call will need to be aware in certain areas not supported by signalling system based call routing, the call may not be answered by the signaller who controls the area. As a result anyone involved in the call must correctly identify who they are speaking to and come to a clear understanding. In these incidents, the GSM-R network will route all urgent point-to-point calls to a '*Nominated Signaller*'.

To help with this, the signaller's identity will be displayed on the cab radio display.

If an Urgent call is routed to a '*Nominated Signaller*' who does not control the area, you must stay in contact with the signaller until you have been assured that the correct signaller will call you.

4.4.3 Standing at signal operational text message

In areas not supported by signalling system based call routing, you must not use the 'standing at signal' (SG) operational text message, as the GSM-R network cannot be relied upon to route the message to the correct signaller.

5 Overview of the GSM-R cab radio

This section provides an overview of the GSM-R cab radio and what it does.

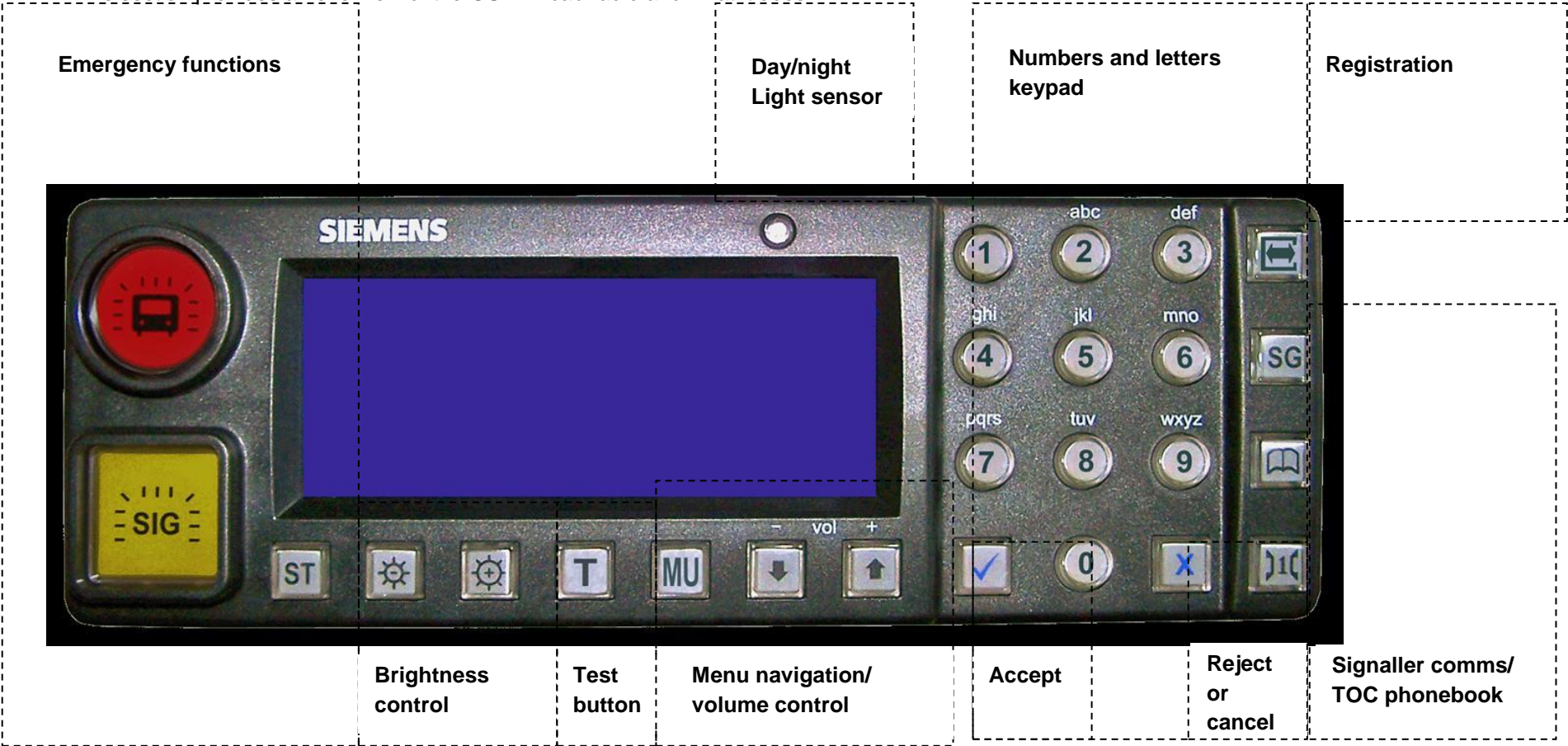


Figure 9 – The GSM-R cab radio layout and controls

GSM-R user procedures (cab radio Version 2)

5.1 Cab radio buttons and what they do

















Button name	Button	What it does
Number		Used to enter numbers and alpha digits when registering, onto the display. Also used to enter text when searching the phonebooks.
Accept		Used to answer calls and accept user entry.
Cancel		Used to reject or end a call and cancel user entry. Press it once to delete the last character entered or hold it down to clear all the characters entered.
Menu		Provides access to the menu.
Phonebook		Provides access to the train operator phonebook
Up		Used to scroll up through the screen or menu options or to increase the volume.
Down		Used to scroll downwards through the screen or menu options or to reduce the volume.
Test		Tests the cab radio.
Increase brightness		Increases the brightness of the display and button backlighting, or scroll along text that is longer than 20 characters.
Reduce brightness		Reduces the brightness of the display and button backlighting, or scroll along text messages that are longer than 20 characters.
Registration		Enables registration and deregistration of the cab radio.
One touch communication buttons		
Standing at signal		Sends the 'standing at signal' operational text message.
Stop acknowledge		Used to acknowledge an incoming railway- emergency group call (stops the 'STOP' message flashing).
Call signaller		To make a call to the signaller.
Emergency		To make a railway-emergency group call.
Urgent call		To make an urgent point-to-point call to the signaller.

Table 2 – Cab radio buttons and what they do

GSM-R user procedures (cab radio Version 2)

5.2 GSM-R cab radio display-screen layouts

The cab radio display contains four lines each with 20 characters and has four different screen layouts depending on how you are using the radio. The display modes are: normal mode; shunting mode; menu layout; and list layout.

5.2.1 Normal-mode layout

The normal layout and associated fields are shown below (the dotted lines are only to show the boundaries between the fields and you will not see these on the display).

Network Name		Headcode	
Status 1		Action	
Call information			
Status 2	Status 3	Status 4	

- The 'network name' will display "GSM-R GB" once the radio has found coverage.
- The 'headcode' field will display the train's TRN, (only after the radio has been successfully registered).
- The 'status 1' field displays the status of an action or process such as a call, in other words "Calling", "Connected", "Incoming" or "Terminating".
- 'Action' identifies an action that the driver might need to carry out particularly during a call, for example, "PTT" (press to talk).
- 'Call information' contains extra information relating to the current process, for example, the identity of the person making an incoming call.
- 'Status 2' is used to provide information about a new incoming call when a call is already in progress (in which case the field will take up the whole display line), or to display information about the battery support.
- 'Status 3', is used to indicate incoming messages.
- 'Status 4' is used for reminders or displaced messages from the 'call information' and 'status 1' fields.

5.2.2 Menu display layout

When displaying a menu the screen will be arranged as shown below. A navigation cursor will indicate the selected menu item and can be moved up and down the list using the scroll buttons.

Menu Item 1
Menu Item 2
Menu Item 3
Menu Item 4

GSM-R user procedures (cab radio Version 2)

5.2.3 List-display layout

When displaying a list, the screen will be arranged as shown below. The phonebook is an example of a listed layout where entries are displayed in alphabetical order, which you can go through using the scroll buttons or using the 'list search' field by entering up to the first three characters to find a particular entry. The list item you have chosen will be identified by a cursor to the left of the item.

List Prompt	List search
List Item 1	
List Item 2	
List Item 3	

5.2.4 Shunting-mode layout

Shunting-mode layout and its associated fields are shown below.

Network Name	Headcode
Status 1	Action
Information 1	
Information 2	Status 2

- The 'network name' and 'headcode' fields are the same as were described previously.
- The 'status 1' field displays the status of an action or process such as a call, in other words, "Calling", "Connected", "Incoming" or "Terminating".
- 'Status 2' is used to display information relating to the battery.
- 'Action' identifies an action that the driver might need to carry out particularly during a call such as "PTT" (press to talk).
- 'Information 1' contains extra information relating to the current process, for example, the identity of the person making an incoming call. It also displays the shunting team number.
- 'Information 2' displays the shunting area number.

5.2.5 GSM-R cab radio menu structure and how to use it

You can use the functions of the cab radio through a menu containing seven top-level headings with up to two further lower-levels. You can get to these menu functions either by choosing a top-level menu option and then a lower level menu option using


combinations of the menu , scroll ,  and accept  buttons, or by entering a menu short cut using the keypad.

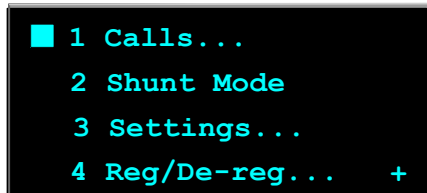
Any menu option which has dots '...' after it shows that there is an associated sub menu and so it will have further options for the user to choose from. The plus (+) sign in the


GSM-R user procedures (cab radio Version 2)


bottom right-hand corner of the display, shows that there are other entries in the current menu.

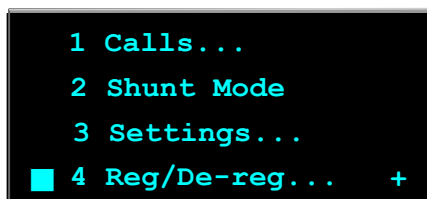
Using the menu, scroll and accept buttons, to get to the pre-registration function is shown below as an example.

Press  to get to the top-level menu.




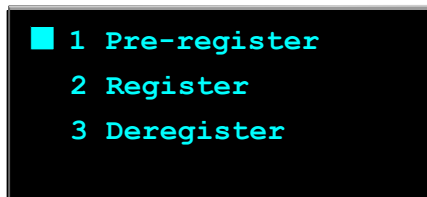
Use  to move the cursor down to item 4 (Register or deregister).

Press  to choose item 4.

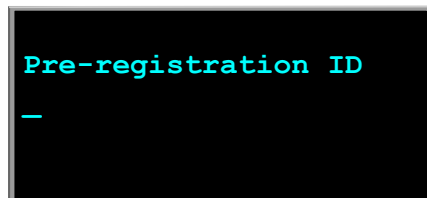


The cursor in the sub menu will automatically go to item 1 (pre-register).

Press  to choose item 1.



The display now shows the pre-registration entry screen.



To get to a function using a menu short cut simply, press the menu button followed by the numbers for the shortcut and then press the accept button, for example, to use the pre-register function, you would press:



‡ One or the other will be displayed but not both

Table 3 presents a detailed view of the menu structure, showing the menu short cuts (numbered), and a short description of the associated function.

GSM-R user procedures (cab radio Version 2)

Main menu (level 1)	Sub menu (level 2)	Sub menu (level 3)	What it does
1 Calls....	1 Operations Control	-	Makes a call to operations control (short dial 1300)
	2 ECO	-	Makes a call to the electrical control operator (short dial 1400)
	3 Trains in Area	-	Not available
	4 Phone book2	List of stored numbers	Displays the phonebook
	5 Other Calls...	1 Build Multiparty	Calls other driver on the train
		2 Train Crew...	Provides a list of other registered on-train staff that you can call
		3 Group Call	Not available
		4 Broadcast Call	Not available
		5 Construct Number	Helps to create and dial an EIRENE functional number
	1 Common Group ‡	-	Makes a call to (joins) the common shunting group
2 Shunt Mode	1 Join Shunt Team ‡	-	Joins a shunting-team call
	2 Exit Shunt Mode	-	Leave shunting mode and returns to normal mode
Settings...	1 Select Network	List of available networks	You can choose the appropriate network from a list
	2 Change Language...	List of SIM defined languages	You can change the language you are using
	3 Restore Defaults	-	Restores all factory settings (language, volume, brightness and so on)
	4 Divert All Calls	1 Activate ‡	Switches on call divert when no divert is on
		1 Deactivate ‡	Switches off call divert when a divert is already on
	5 Read SIM		Reads the information you have chosen from the cab radio SIM
	6 Auto Network		Allows the user to put into automatic network mode
4 Reg/De-Reg	1 Pre-register	-	Enables user to enter registration details for later use (pre-register)
	2 Register	Selection of Functional Role	Provides a list of functional roles for you to select from
	3 Deregister	-	You can deregister the cab radio functional numbering
	4 Show Registered		Displays a list of currently registered identities
5 Maintenance...	1 Fault Code Help...		Text description giving maintainer further information about fault codes
	2 Handset Test		Allows you to test the microphone and earpiece using the PTT
	3 Loudspeaker Test		A facility for testing the loudspeaker
	4 Button Tests	1 Red ButtonTest	A facility for testing the emergency button
		2 Yellow Button Test	A facility for testing the urgent call button
	5 Attached Systems		Enters the button testing sub menu
	6 PA Tests	1 PA Tone Test	Allows the driver to test the PA connection on the train using either a tone or speech test
		2 PA Speech Test	
	7 Version Info.	1 Stock Number	Provides a sub menu offering options to display various version information about the radio
		2 CM Serial Number	
		3 Software Version	
		4 Trx Type	
		5 Trx Model	
		6 Trx Version	
		7 IMEI	
	8 Fault Log		Displays a list of the last 50 fault events
6 Messages...	1 Send Message...	List of operational messages	Not available
	2 Received Msgs...	List of received messages	Not available

GSM-R user procedures (cab radio Version 2)

Main menu (level 1)		Sub menu (level 2)		Sub menu (level 3)	What it does
		3	Sent Messages...	List of sent messages	Not available
		4	Cell Broadcast...	List of received messages	Not available
7	Retrieve Call			-	Reconnects a held call
	In-call menu	1	Hold/Swap Call	-	Used to swap between two calls for example an ongoing and incoming call
		2	Join Calls	-	Allows you to make or extend a call between more than one person (multi-party call)
		3	Remove Party...	-	Removes someone from a multi-party call

‡ One or the other will be displayed but not both

Table 3 – GSM-R Cab radio menu structure

6 Entering service

6.1 Preparing the cab radio

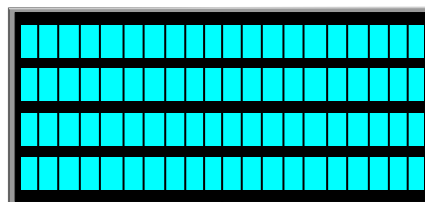
Before a train enters service, you must check the operational status of any cab radio that is to be used during the journey. This is normally the responsibility of the person who is carrying out train-preparation duties.

6.1.1 Traction unit power on

Whenever the traction unit is cut in the cab radio will also power up and automatically test itself. The start and end of the self-test is displayed on the cab radio. The display also shows you the progress of the test. If there is more than one display unit associated with the cab radio, for example, on a locomotive, the status of the self-test is displayed on both.

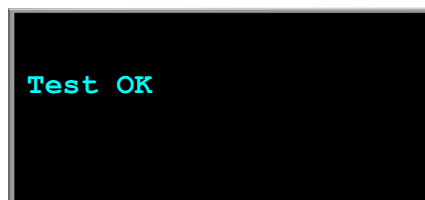
The cab radio initialisation process consists of a number of stages. The commencement of each stage will cause a change of state on the display:

When the traction unit is powered on, the cab radio power-up sequence begins and the display and keypad backlighting will be lit up momentarily.



Each stage of the process will be shown with an appropriate message such as Initialising, Powering up and Testing. During this process software version 2 is identified by NR 3.1 showing on the display.

When the self-test has finished the message 'Test OK' is displayed. The message will remain in the display for 15 minutes, after which the cab radio will go into standby mode causing the display to go blank.



To make a call, while the 'Test OK' message is displayed, you will need to switch on the cab radio display (see section 6.1.2).

❗ If the cab radio fails the self-test refer to section 9.2.

6.1.2 Switching on the cab radio display unit (using your driver's key)

Once you have cut the traction unit in and the cab radio has completed its automatic self-test, the display will switch off. Before the cab radio can be used operationally you must switch on the display by simply inserting your driver's key and moving the master switch away from the 'off' position.

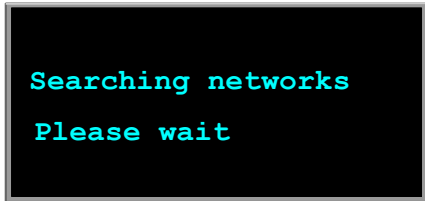
When switching on the cab radio's display, it will light up momentarily.

GSM-R user procedures (cab radio Version 2)

Once switched on the GB GSM-R network name will be displayed (“GSM-R GB”), showing that the cab radio has connected to the GSM-R network.

A black rectangular display with the text "GSM-R GB" in red, monospaced font at the top.

If the cab radio does not find network coverage, for example, due to a local network problem or in an area not yet operating with GSM-R, the display will show ‘Searching networks, Please wait’.

A black rectangular display with the text "Searching networks" and "Please wait" in red, monospaced font, stacked vertically.

If the cab radio does not find coverage at all refer to section 9.2.6.


Once the cab radio has found the network it is ready to use (in other words it can make and receive calls). However, if the display unit is in the cab from where the train will be driven, you must register the cab radio with the GSM-R network (see section 6.2).

While the cab radio is unregistered, although it can make and receive calls (including emergency and urgent calls), the signaller will not receive the TRN or additional location information provided by signalling-system based call routing. In addition, the signaller will not be able to call you using the TRN and will have to find your train’s stock number from other systems.

If using the cab radio while it is unregistered you **must not** use the call signaller or standing at signal buttons, as the call or message might not be connected to the right signaller.

An unregistered train is also able to send a DSD alarm message to the signaller so it is important that (if you are the driver) you register the train to make sure that the message accurately identifies your train identity and location and is sent to the signaller controlling the movement of your train.

In certain circumstances it may be necessary to use the cab radio without inserting a driver’s key.

Provided the driver’s key is out, you can switch on a cab radio by pressing the  button for at least two seconds. However, if the cab radio is not used for a period of 30 minutes it will automatically switch off.

- ① If the train is only fitted with a single train radio, but has two associated cab radio display units, for example, a locomotive, then calls can only be made from one cab radio display unit at a time.

6.1.3 If the cab radio is already registered when switched on

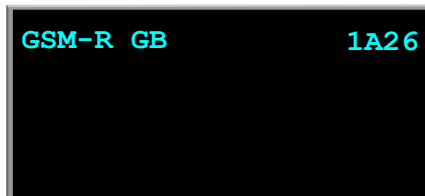
If the cab radio registration was retained by the previous driver when leaving the cab, then the registered TRN will be displayed in the top right corner of the radio’s display. If this is the correct train TRN for your journey then the cab radio is already correctly registered. If

GSM-R user procedures (cab radio Version 2)

not, you must deregister the TRN that is displayed and register the correct train TRN for your journey (see section 6.2.1) provided to you by your company.

Registration retained by the previous driver.

Ensure that the train reporting number (headcode) is correct for **your** journey.



6.1.4 User adjustable cab radio settings

The cab radio has pre-defined volume and brightness levels set already, you can change these when using the cab radio. These settings will be retained for 30 minutes after the radio is switched off. Also, the next time the cab radio is powered up it will return to the default settings.



6.1.4.1 Adjusting the cab radio handset or loudspeaker volume

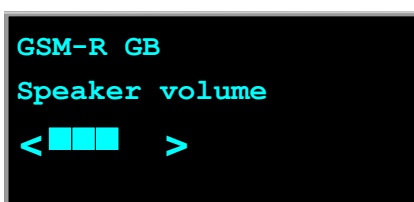


You can use the 'up' and 'down' arrow buttons to adjust the cab radio's handset and loudspeaker volume when the radio is not being used or is in a call.

If you use the volume control buttons when the handset is in its cradle, you can change the volume of the loudspeaker. If the handset is not in its cradle, you can change the volume of the handset.



6.1.4.2 Adjusting the loudspeaker volume

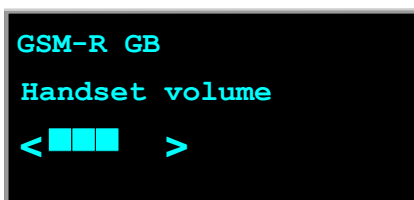
When the handset is in the cradle and the display is not showing any menu or list, press either the  or  button to get access to the speaker volume control setting bar.





6.1.4.3 Adjusting the handset volume

When the handset is **not** in the cradle and the display is not showing any menu or list,

press either the  or  button to get the handset volume control bar.



GSM-R user procedures (cab radio Version 2)

In either case, use the appropriate button to increase  or reduce  the volume. The volume setting bar will change (as does the audible volume, if the relevant audio path is open).

If you are in a call, simply pressing the up and down buttons will change the relevant volume control.

If you do not make a change within a two-second period, the volume control will be cleared from the display and the current setting will apply.


You can turn the volume down to a minimum setting but you cannot turn it off completely.


6.1.5 Adjusting the brightness of the cab radio

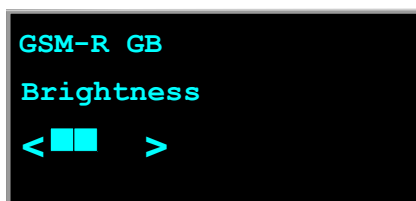


A sensor on the front of the display unit automatically manages how bright the cab radio is, switching between day and night settings. However, there might be times when you want to increase or reduce the brightness to suit your needs. You can do this by using the brightness controls.

Pressing either of the brightness control buttons will display the brightness control.

Press  to increase the brightness.

Press  to reduce the brightness.



Each press of the button changes the brightness by one level. When you are happy with the setting do not touch any of the buttons for two seconds or longer and the control will disappear from the display.

You can reset the default settings (volume, brightness, language and so on) using the menu button.



6.2 Cab radio registration

Before a train can enter service, you must register the cab radio with the GSM-R network. This means that all calls and operational text messages sent from the cab radio are routed correctly and identified by the TRN. Only the driver needs to register, other users do not.

- ① Locations where cab radios must be registered or pre-registered are published in the Sectional Appendix and/or Periodical Operating Notice (PON).

Once registered the cab radio is secure and can be used for passing operational instructions.

GSM-R user procedures (cab radio Version 2)

- ① If it is not possible to register the cab radio then you may need to revert to an alternative secure method of communication for the passing or receiving of operational instructions, as shown in the rule book.
- ① If it is not possible to register the cab radio then there is a risk of voice calls and operational text messages being routed to the wrong signaller. Always check the cab radio display to be sure you are connected to the correct signaller and confirm the identity of the person you are speaking to once communication is established.

To register the cab radio, you will need two pieces of information that make up the registration code. These are:

- a four-digit train reporting number (headcode) and
 - the identity of the signal at which the train is standing (the location code).
- ① Note at some locations an alias plate will provide the required location code (see 4.3) or wildcard location code (99x).

Once you have this information, you can register the cab radio.

6.2.1 Train reporting number (Headcode)

The TRN, is provided by your company, normally printed on your 'driver's diagram' (or equivalent).

6.2.2 Location Code

Because TRNs are not unique nationally, and the GSM-R network is a national communications system, it is necessary for the network to be able to differentiate between trains during the registration process, so as to prevent registration failures due to duplicate TRNs. This is achieved by entering information relating to the location from which you are attempting to register, thus making the registration code an almost unique 7-digit number.

Before trying to register a cab radio, you will need the last three digits of the signal at which your train is standing (the train must be stationary for this to work). If the signal has fewer than three digits, you will need to add a zero at the beginning.

In certain places alias plates will be installed for registration purposes (see Figure 6).

There will also be instances where you will have to enter a wild card number for the location code of the format 99X, where 'X' depends on where you are or the route you will be taking after registering. This is covered in more detail in section 6.2.4.

- ① Before you can successfully register using a normal location code in a signal assisted call routing area, the TRN must have been entered into the relevant signal berth on the train describer and the train must be standing in that signal berth when you register the cab radio. If this is not the case then a 'Registration failed' message will be returned.


Where two or more trains are sharing a platform or siding the driver of the second train to depart must not register the cab radio using the signal number until the first train has departed and the signal has returned to danger.

GSM-R user procedures (cab radio Version 2)

- ① In signal assisted call routing areas there is normally only one train describer berth associated with each signal section and it will always contain the TRN of the first train scheduled to depart. Therefore if you are the driver of the second train and you attempt to register the cab radio before the first train has departed, you will block the first train's registration.

In signal assisted call routing areas you must only register the radio at a main aspect signal and not at a position light signal unless the sectional appendix says that you can or an alias plate is provided.

6.2.3 Registering with the driver's key on

The simplest way to register is by pressing  on the cab radio, while your driver's key is inserted.

- ① You must not register a train whilst it is moving, as registration is likely to fail. This can only be achieved by the pre-registration process as shown in 6.2.4.




Press .

You will be asked for the registration code which is the TRN followed by the location code.

GSM-R GB
Registration code
—

Enter the information using the keypad.

GSM-R GB
Registration code
1A45 159

Press  to send the registration code to the GSM-R network.

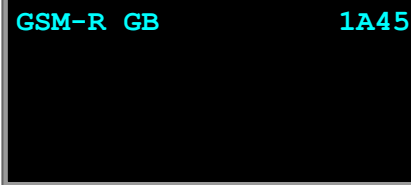
GSM-R GB
Registering
1A45 159 Lead Driver

Once the GSM-R network has received the registration code, it will be displayed in the top right-hand corner of the display and you will be asked to wait for the train reporting number.

GSM-R GB
Wait/check head code
1A45 159

GSM-R user procedures (cab radio Version 2)

When you have successfully registered, you will hear a tone and the train reporting number will be displayed.

A black rectangular screen with a thin grey border. It displays 'GSM-R GB' in cyan text on the left and '1A45' in cyan text on the right.

You must make sure that the train reporting number displayed is correct for the journey.

If you do not have the TRN, for example the train is not a pre-planned move; you can get the number from the signaller.

If there is no network coverage at the time you need to register the cab radio and it is not a planned pre-registration location, then the cab radio will save the registration code and complete the registration process automatically when GSM-R GB coverage is regained. This is known as 'pending registration' see section 9.3.6. In this case the special location wild card code '99x' will need to be used.

6.2.4 Pre-registering the cab radio

During the national rollout of GSM-R you may need to use NRN or CSR for the start of the journey and transfer to GSM-R at a later stage (see section 4.2). You can make the transfer to GSM-R on the move as long as you have stored the appropriate registration code in the cab radio when not moving. This process is known as 'pre-registration'.

You can only pre-register the cab radio using the menu.


When pre-registering the cab radio you must use the special "wild card" location code which begins 99X ('X' depends on the area that you are in at the time). The Sectional Appendix will identify the value of X, which will be a number between 0 and 9.

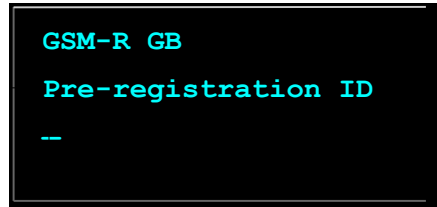
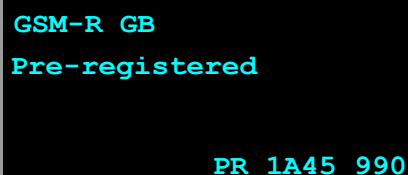
You must only use the 99X location code when pre-registering or at times where there are GSM-R network problems, which will be indicated to you by the signaller or by operating notices.

To use the pre-registration function choose menu option 4, 1, (pre-registration).



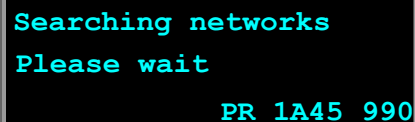
Enter the train reporting number (headcode) and wild card using the cab radio's keypad and

confirm the entry by pressing . The cab radio is now pre-registered. The normal registration sequence will follow.


A black rectangular screen with a thin grey border. It displays 'GSM-R GB' in cyan text on the left, 'Pre-registration ID' in cyan text on the right, and a dashed line '--' in cyan text below it.A black rectangular screen with a thin grey border. It displays 'GSM-R GB' in cyan text on the left, 'Pre-registered' in cyan text on the right, and 'PR 1A45 990' in cyan text at the bottom right.

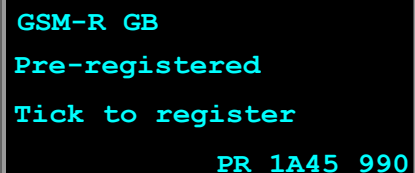
GSM-R user procedures (cab radio Version 2)

While the cab radio is outside the GSM-R coverage area, the display will show that it is searching for the network.



Searching networks
Please wait
PR 1A45 990

Pressing  at the point that you need to register within the GSM-R coverage area will begin the registration process. It will send the registration identity to the GSM-R network.



GSM-R GB
Pre-registered
Tick to register
PR 1A45 990

If the cab radio has been pre-registered but fails, for any reason, to register when you press the tick key at the start of GSM-R section sign, or if the wrong TRN is displayed when registered, you should attempt to register again when safe to do so. If the second attempt also fails, you will need to contact the signaller at the first opportunity to report the failure.

If the TRN displayed is a duplicate see section 9.3.5.

6.3 Deregistering the cab radio

At the end of each journey you must deregister the cab radio (or when reaching the end of GSM-R coverage and the radio is not intended to be used later in the journey). It is important that you deregister the cab radio (unless you are keeping the same TRN for the journey, see section 6.4 – keeping registration). This will avoid duplicating registration identities and make sure that the TRN is removed from the signaller's fixed terminal.

When changing ends you must deregister the previous TRN and register the new one at an appropriate time and place (within a GSM-R coverage area and with the train at a stand).

- ① Before you can successfully register using a normal location code in a signal assisted call routing area, the TRN must have been entered into the relevant signal berth on the train describer and the train must be standing in that signal berth when you register the cab radio. If this is not the case then a 'Registration failed' message will be returned.

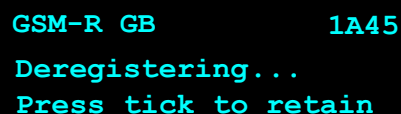
You must deregister the cab radio where GSM-R coverage is available, as it relies on the cab radio communicating with the GSM-R network. Until the GSM-R network is rolled out fully, the end of a GSM-R coverage area will be shown by a lineside sign (see section 4.1). You must deregister the cab radio upon reaching this sign unless your train is scheduled to enter another GSM-R area further on in its' journey.

6.3.1 Deregister the cab radio (end of journey)

The simplest way to deregister the cab radio at the end of a journey, when you will not be returning to the train, is by taking your key out.

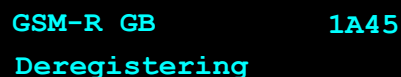
GSM-R user procedures (cab radio Version 2)

Once you have removed the driving key, the cab radio will offer you the option to keep the registration (see section 6.4), for example, if you change ends on a locomotive. If you do not take any action, it will lead to automatic deregistration after 10 seconds.




GSM-R GB 1A45
Deregistering...
Press tick to retain

Or, press  to deregister the cab radio immediately.



GSM-R GB 1A45
Deregistering

Alternatively, you can use the “Reg/Dereg” button to deregister, followed by pressing the  key.

You should observe that the deregistration is successful.

Once deregistered and the driver's key is off, the cab radio display will automatically switch off.

6.3.2 Deregister the cab radio (start new journey)

Use this process to deregister the cab radio if you are required to change the TRN on route, for example, a scheduled change from a class 5 train (ECS) to a class 1 or 2 (passenger train).

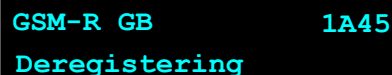
In this instance you must use  to deregister the cab radio.

Press and release the  button in less than two seconds.



GSM-R GB 1A45
Confirm deregister?

Press  to confirm.




GSM-R GB 1A45
Deregistering

You will also need to use this method if you need to deregister the radio at the end of GSM-R coverage and the driver's key will not be removed, for example, when switching to NRN or CSR radio.

GSM-R user procedures (cab radio Version 2)

6.4 Keeping registration

There might be times when you want to keep the registration, for example, when changing ends on a locomotive or temporarily vacating the cab. Under these circumstances you will still decommission the driving cab in the normal way by removing the driver's key, however, when prompted, you have 10 seconds to keep the registration by simply

pressing . This will keep the cab radio registered for 30 minutes.

If the radio is not reactivated using the driver's key within 30 minutes, the radio will automatically deregister all previously registered functions.

6.5 One-touch communication buttons

There are three one-touch buttons that allow you to make calls by pressing a single button. They are shown below.

6.5.1 Call signaller button

The call signaller button allows you to easily make a point-to-point call to the signaller who controls the area. However, you can only use this function in designated areas (see section 4.4).



6.5.2 Urgent priority point-to-point call button

The urgent priority point-to-point call (yellow) button will make a point-to-point call to the signaller who controls the area. However, in certain areas not supported by signalling system based call routing (see section 4.4), the call may be routed to a Nominated Signaller, for example, the signaller may not be the controlling signaller for the location



Because of the GSM-R network's ability to tell the difference between types of calls, the call will be presented to the signaller as an urgent call with a distinctive alarm. However, there may be other calls of a higher priority ongoing or higher in the call queue; hence the signaller may not answer immediately.

6.5.3 Railway-Emergency Group call button

The Railway-Emergency Group call (red) button allows you to make an emergency group call that will be received by all cab radios and people using fixed terminals within a certain area (see section 7.3.6). Using this button will lead to all trains stopping in the immediate area.

You must use the PTT with this type of call.



6.5.4 Accidental use of the railway emergency group call button

In the event that you accidentally press the red Emergency call button, when the signaller answers you must inform the signaller that the red button has been accidentally pressed to avoid confusion and unnecessary train delays.

GSM-R user procedures (cab radio Version 2)

6.6 Using phonebooks

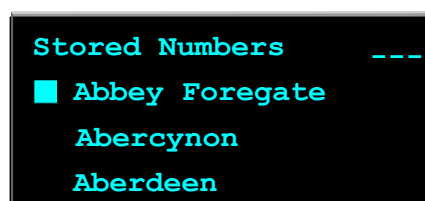
6.6.1 Phonebook dialling

The design of the cab radio includes a Network Rail phonebook which can store up to 1200 phone numbers. The numbers are those of Network Rail signallers, operations controllers and Electrical Control Operators. The actual numbers are not listed but instead the names of the locations, for example, Yoker West. This gives access to every fixed terminal GSM-R phone number in the country. A separate phonebook (maintained by the train operator) will store specific operator contact numbers.


6.6.2 Using the Network Rail phonebook

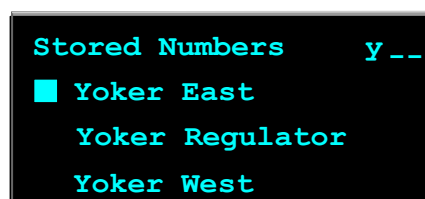
You will be able to use the Network Rail phonebook by pressing , , .

The entries in the phonebook are listed alphabetically and you can search them using the scroll buttons to move the cursor up and down the list.




To speed the process up you can enter up to the first three letters of the identity that you are looking for into a search field using the keypad, for example, to find the signaller for Yoker East, press the '9' button three times to display the letter 'Y' in the search field and show the entries beginning with 'Y' on the display. If you enter any further letters (up to a maximum of three), it will refine the search further. You can also use the scroll buttons to make your choice.

Once you have found the fixed terminal user you need, press  to make the call.






6.6.3 Using the train operator phonebook

You will be able to use this phonebook in exactly the same way as described above. To access the operator phonebook press .

① When searching the phonebook be aware that the search function does not sort the list of entries alphabetically and you may need to manually search using the scroll keys.

6.7 Keypad dialling

   You can also make calls from the cab radio by simply dialling the phone number, using the keypad.


  

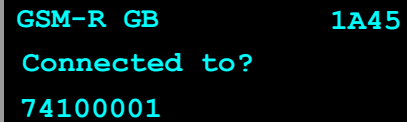
  



GSM-R user procedures (cab radio Version 2)

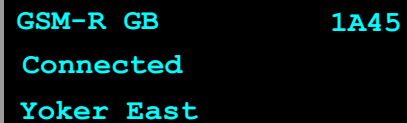
Once you have pressed the first digit the 'Connect to?' message is displayed. Enter all digits using the keypad in this example the full 8-digit fixed terminal phone number.

To make the call press .



GSM-R GB 1A45
Connected to?
74100001

Once the call is connected, the name of the person you are calling will replace the dialled number on the display (if the number is found in the phonebook).




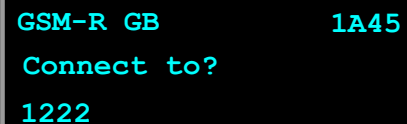
GSM-R GB 1A45
Connected
Yoker East

- ① Only GSM-R numbers can be dialled using the keypad. Other numbers, for example, public network numbers, can only be called from the cab radio phonebooks.

The next example shows a call from the cab radio to the signaller by dialling the '12nn' short code number.

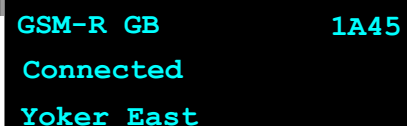
Once you have pressed the first digit the "Connect to?" Message is displayed. Enter all digits using the keypad.

To make the call press .



GSM-R GB 1A45
Connect to?
1222

Once the call is connected, the name of the person you are calling will replace the dialled number.



GSM-R GB 1A45
Connected
Yoker East

7 Using the cab radio to communicate

These procedures must be used alongside the rule book. You must always use GSM-R as the normal radio system if it is available for use. That is, if a GSM-R cab radio has been fitted and commissioned in the cab of the train, and the route for your journey is covered by GSM-R as indicated in the sectional appendix and by line side signs.

7.1 Receiving a call

When you receive an incoming call, you should always follow the correct procedure and only respond providing you can do so safely.

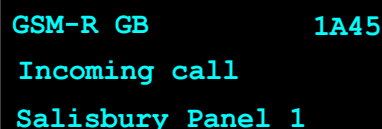
7.1.1 Receiving a point-to-point call

Under normal operating conditions it will be rare that you receive a point-to-point call. This is because signallers will normally request you to call them by sending you a 'Contact Signaller' operational text message (see section 7.2.1). However, if your train is stationary then the signaller can make a point-to-point call.

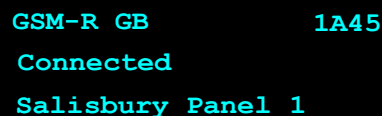
When you receive a point-to-point call, the cab radio will ring until the call is connected. The display will show the caller's identity.

The cab radio will answer most calls automatically, for example, calls from signallers, with speech at first sent over the loudspeaker.

You must check that the person you are talking to is the same as the one displayed.



GSM-R GB 1A45
Incoming call
Salisbury Panel 1





GSM-R GB 1A45
Connected
Salisbury Panel 1

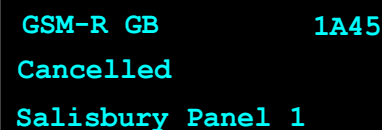
- ① Non-operational calls will not be automatically answered and will require the driver to either lift the handset or press the  button to answer the call.

You must respond to the incoming call only when it is safe to do so, by lifting the handset from the cradle and speaking into the mouthpiece. You will now hear the signaller through the handset. You will also still be able to hear the speech at a much lower level through the loudspeaker when the handset is off its cradle.

Even though the call will be answered automatically after 2 ring cycles, you will have a few seconds in which you can, if you want to, reject the incoming call.

To reject an incoming call, press  while the cab radio is ringing.

Pressing  or replacing the handset whilst in a point-to-point call will end the ongoing call.



GSM-R GB 1A45
Cancelled
Salisbury Panel 1

GSM-R user procedures (cab radio Version 2)

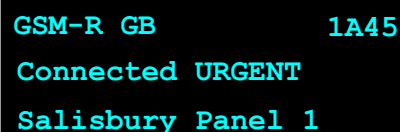
7.1.2 Receiving an urgent point-to-point call

There may be times when the signaller needs to communicate urgently with you, but the circumstances do not warrant the use of a railway emergency group call.

The urgent point-to-point call allows the signaller to contact you quickly, as the priority of the call will automatically end an ongoing call you may be in which has a lower priority, such as a normal point-to-point call.

The cab radio will respond in the same way as with a normal point-to-point call (see section 7.1.1) however, the urgency of the call will be displayed.

The cab radio will answer an incoming urgent point-to-point call automatically after 2 ring cycles.



GSM-R GB 1A45
Connected URGENT
Salisbury Panel 1

Urgent calls the signaller makes will be announced with the following message.

“This is an urgent call from the signaller at..... to the driver of (train reporting number)...”

When you receive an urgent point-to-point call, you must respond to it as quickly as possible, as long as you can do so safely.

7.1.3 Receiving a railway emergency group call

You might receive a railway emergency group call (see section 2.3.4). If you are already in a call when the cab radio receives the railway emergency call, your current call will be terminated and you will join the emergency call. If this happens you should replace the handset in the cradle and listen to the emergency communication (this action will not terminate the railway emergency call as you will not be the initiator).

- ① Remember a railway emergency group call must be treated as shown in the rule book relating to phrases when using a radio in which only one person can be heard at a time.

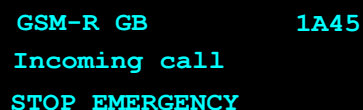
The railway emergency group call is split into three clear phases.

GSM-R user procedures (cab radio Version 2)

Phase 1 - the warning

All cab radio users in the emergency group call area will hear an alarm and see a warning on the display, even if the radio has not yet been registered.

When you receive a railway emergency group call, the cab radio will let you know with an audible alarm message “Emergency, Emergency, Emergency” and the message ‘STOP EMERGENCY’.

A screenshot of a black rectangular display with red text. The text is arranged in four lines: "GSM-R GB" and "1A45" on the first line, "Incoming call" on the second line, and "STOP EMERGENCY" on the third line.

GSM-R GB 1A45
Incoming call
STOP EMERGENCY

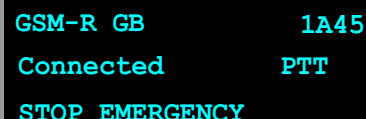
When you receive a railway emergency group call, you must stop your train immediately and not move until authorised to do so by the signaller.

- ① If your train enters the emergency group call area after the call was set up, you will still receive the alarm and ‘STOP’ message. You must stop your train immediately. However, you will join the call part-way through and so may miss the beginning of the voice message.

Phase 2 – communicating

The end of the alarm shows that the railway emergency group call has begun and that all users in the emergency group call area are connected.

You can see confirmation that the call is connected and a reminder that the PTT must be used if you are going to communicate with the signaller. Once connected, you will hear speech through the loudspeaker. Once you have brought your train to a complete stand, you must acknowledge the railway emergency call and cancel the flashing ‘STOP’

A screenshot of a black rectangular display with red text. The text is arranged in four lines: "GSM-R GB" and "1A45" on the first line, "Connected" and "PTT" on the second line, and "STOP EMERGENCY" on the third line.

GSM-R GB 1A45
Connected PTT
STOP EMERGENCY

message by pressing the  button.

The person who makes the call can now pass their message. All other users will be able to hear the message, but must not interrupt. To keep control of the multi-party call, only one mobile user can speak at a time. This is governed by the network and using the PTT button.

If other users need to speak, they must wait for the first conversation to end and for the signaller to invite any other parties to add any further information relevant to the emergency.

You will see a reminder on the cab radio to prompt you to use the PTT if you need to speak. When you press the PTT you will hear a short confirmation tone while the network sets up the speech channel. Once the speech channel is available to you, at the end of the short tone, you will see the message “Speak” and you can now pass your message to the signaller.

- ① If another cab radio or handportable user has taken control of the voice connection to the signaller, you will not be able to speak until the other user releases their PTT. In

GSM-R user procedures (cab radio Version 2)

this case, at the end of the short confirmation tone you will hear a 'busy' tone and see the message 'busy' on the cab radio display. Holding down the PTT until the other user releases their PTT will not work. You have to release your PTT and press it again when you see the "PTT" prompt.

Railway emergency group calls made by the signaller will be announced with the following message:

"This is a railway emergency call. I repeat, this is a railway emergency call, from the signaller atto all trains in the area."

Unless absolutely necessary, you must only listen to the voice communication. If you try to take part in the railway emergency group call it may prevent vital safety-related information from being given (this is because using the PTT and getting a voice connection will prevent anyone else speaking at that time).

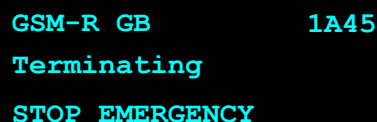
So, if you receive a railway emergency group call, you must listen to the message, and only take part in the call, if asked to do so by the signaller or if you need to provide vital information about the emergency.

Phase 3 - ending of the call

The signaller with 'Lead Responsibility' will end the railway emergency group call, but only when they are sure that the situation is under control. Once the emergency communication has been completed, the signaller will signal the end of the call by stating:

"...end of railway emergency group call."

If you received the railway emergency group call, you must not move your train until the railway emergency group call has ended, you are sure your train is not affected by the emergency and you have not been instructed to remain at a stand.



GSM-R GB 1A45
Terminating
STOP EMERGENCY

7.1.3.1 Unexpected termination of the railway emergency group call

For example if you leave the railway emergency group call area before your train has been brought to a stand, the network will end the call to your cab radio. However, you must continue to bring your train to a stand and contact the signaller using a point to point call and await further instructions.

7.1.3.2 Entering an area once the REC has commenced

If you have stopped your train upon entering the railway emergency group call area after a call was set up, and you missed the beginning of the message, attempt to gain as much information as possible by listening to the call. You must not move until the railway emergency group call has been terminated, you have received no specific instructions not to move and you are sure your train is not affected by the emergency.

7.1.3.3 If you do not understand the message or the message seems incomplete

GSM-R user procedures (cab radio Version 2)

Wait until the railway emergency group call has ended and contact the signaller using a point to point call. **Do Not** move your train until you have received enough information to determine that your train is not affected by the emergency.

7.1.3.4 Instructed to remain at a stand by the signaller

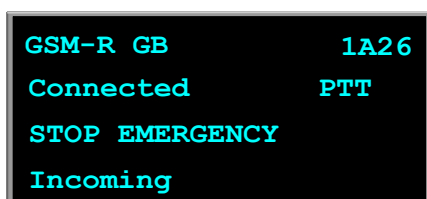
In the event that a signaller has instructed you to remain at a stand; once the Railway Emergency Group Call is terminated you should remain at a stand until contacted directly by the signaller and authorised to move.

Note: Drivers must not contact the signaller with a request to restart and must take into consideration that the signaller requires time to protect an area and manage the emergency.

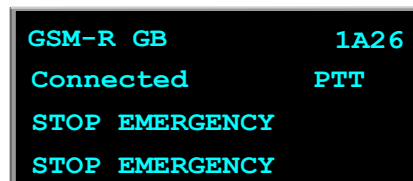
7.1.3.5 Receiving another railway emergency group call

If another GSM-R user makes a railway emergency group call in that affects your area, this will be identified as another incoming call.

The new call will be shown on the bottom line of the cab radio display and the last line will alternate between “Incoming” and “STOP EMERGENCY”.



GSM-R GB 1A26
Connected PTT
STOP EMERGENCY
Incoming

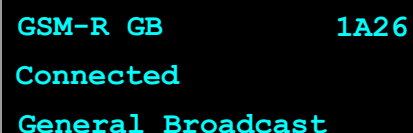


GSM-R GB 1A26
Connected PTT
STOP EMERGENCY
STOP EMERGENCY

You should continue to take part in the ongoing call unless the signaller tells you to do otherwise.

7.1.4 Receiving a general broadcast call

Signallers and operations controllers will use a broadcast call to give out general information that might affect the running of trains, for example, warnings of service disruption on a particular section of line.



GSM-R GB 1A26
Connected
General Broadcast

The cab radio will show the same messages as described in section 7.1.1. However, once the call is connected, the display will show the type of call, that is, a General Broadcast call.

The signaller/operations controller will announce the General Broadcast with the following standard introduction.

“This is a general broadcast from the signaller/operations controller at to all trains in the area.”

General Broadcast calls will end with the following voice message:

“...end of general broadcast.”

GSM-R user procedures (cab radio Version 2)

You must listen to the message being announced and, if necessary, pass on the information to other onboard members of staff or passengers on the train.

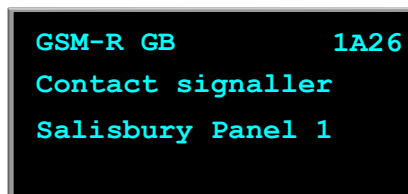
- ① A broadcast call is normally a pre-recorded announcement and might be joined (or left) by the cab radio part-way through if the train enters/exits the group call area. As a result, the start and end of the message will be as described above to allow you to know whether the entire message has been received.

If only part of the broadcast call was received and you are unsure of its relevance to you, then you can seek clarification from the signaller.

7.2 Receiving operational text messages

7.2.1 'Contact signaller' message


If the signaller needs to speak to you, and it is not urgent, the signaller will ask you to call him/her using the 'Contact signaller' operational text message.




GSM-R GB 1A26
Contact signaller
Salisbury Panel 1

You will hear a short alert tone to let you know about the contact signaller message. The message will be shown on the display along with who sent it.

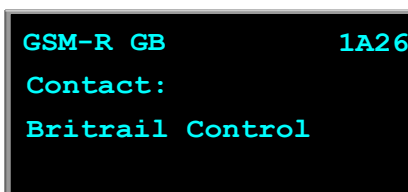
When you receive the 'contact signaller' message, you must contact the signaller as soon as possible as long as you can do this safely.

You can make a call to the signaller by simply pressing . (See section 7.3.1).

- ① If you respond by pressing the  button, there is no guarantee that the call will be connected to the signaller who sent the 'Contact signaller' message as the train may have moved out of that signaller's area by the time you respond.

7.2.2 'Contact Train Operator' control message

Operational text messaging can also be used by your Train Operating Company to contact you. Response to this message is the same as previously shown in 7.2.1.



GSM-R GB 1A26
Contact:
Britrail Control

- ① Your company will advise you if this function is available to them.


7.3 Making calls

You should only make outgoing calls providing you can do so safely and you must always follow the correct procedure.

7.3.1 Point-to-Point call to signaller

You should use the point-to-point call when you need to contact the signaller to carry out your normal duties. For instance, you may need to relay information about on train faults.

GSM-R user procedures (cab radio Version 2)

The simplest way to make a point-to-point call is to press the call signaller button .

However, in some areas it cannot be guaranteed that the call will be routed to the correct signaller. In these areas, signal box phone number signs or short code '12nn' signs (see section 4.4) give you a direct-dial number to the controlling signaller.

You can also look up the signaller in the menu phonebook (see section 6.6.2)





The cab radio will sound a ringing tone and display that a call is being made.

```
GSM-R GB          1A26
Calling
Signaller
```

When the signaller answers the call, the display changes to show the call is connected and who you are connected to.

```
GSM-R GB          1A26
Connected
Salisbury Panel 1
```

You must check that the person you are talking to is the same as the one displayed (see section 2.8).

You can press the  button to cancel a call before it is answered. You can also press , or replace the handset, to end a call when you have finished speaking.

7.3.2 Unable to connect a call

If the number called is busy, you will hear a busy tone instead of the ringing tone and the message displayed.

```
GSM-R GB          1A26
Busy
Salisbury Panel 1
```

If the number called is not an available number, then an 'unobtainable' tone will be played and message is displayed.

```
GSM-R GB          1A26
Unobtainable number
```

GSM-R user procedures (cab radio Version 2)

If the call failed to connect then a 'failed to connect' tone (same as unobtainable tone), will be played and message displayed.



GSM-R GB 1A26
Failed to connect

7.3.3 Calling a signal box that has closed

If a signal box closes on a line still open to traffic, the signaller in another signal box will normally take over the communication role of that box. In these circumstances you must communicate with the adjacent signaller.

- ① If you call a signal box that is closed, the call may be automatically routed to the adjacent signaller (information concerning these locations will be published in the Sectional Appendix), if this happens, once the call has connected the identity of the signal box that answers the call will be displayed on the cab radio.

7.3.4 Calling a signal box or panel where the role is being managed by another signaller


There are times when the role of a GSM-R fixed terminal in a particular signal box or panel might be taken over by another signaller such as where the fixed terminal has failed, for instance. In these instances the signaller will identify himself in his normal role but explain why he is answering the call.

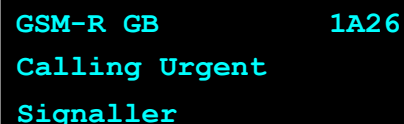
7.3.5 Urgent point-to-point call

The urgent point-to-point call allows you to contact the signaller with a higher priority than you would need for a normal point-to-point call for situations where you need to contact the signaller urgently. However, the matter is not serious enough to stop other trains in the area.

To make an urgent point-to-point call, you must press the 'urgent call' (yellow) button.



The cab radio will display similar messages to those described in section 7.3.1, except that the display shows an urgent call and the  button flashes.

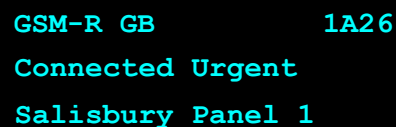


GSM-R GB 1A26
Calling Urgent
Signaller

- ① The signaller will receive a distinctive alarm to draw his attention to the urgency.

GSM-R user procedures (cab radio Version 2)

When the signaller answers the call, the display will change to show the call is connected.

A black rectangular display with cyan text. The text is arranged in three lines: "GSM-R GB" followed by "1A26" on the right; "Connected Urgent" in the middle; and "Salisbury Panel 1" at the bottom.

GSM-R GB 1A26
Connected Urgent
Salisbury Panel 1

If the number you are calling is busy, or the call fails for any reason you will hear an appropriate tone instead of the ringing tone and the display will show the same messages as those for the point-to-point call (section 7.3.1).

7.3.6 Railway emergency group call

In a critical situation, for example if you see an incident that causes the line to become unsafe, you must make a railway emergency call to stop trains and contact the signaller immediately.

The railway emergency group call is made by pressing the emergency button. Anyone using GSM-R in the emergency group call area will receive the group call (see section 7.1.3).

You must STOP your train when making an emergency call to ensure you remain in the group call area and are able to complete passing your message. If you continue, you may exit the group call area and you will drop out of the call.

- ① Remember a railway emergency group call must be treated as shown in the rule book relating to phrases when using a radio in which only one person can be heard at a time.
- ① The railway emergency group call area will always include at least one signaller and an operations controller. The signaller who controls the area concerned (Lead Signaller) will normally be responsible for responding to the call. However, if for any reason the correct signaller is unable to respond, then the responsibility for responding to the railway emergency group call passes to one of the other fixed terminal users, for example, the operations controller.

The effect of a railway emergency group call will be widespread. This is because emergency group call areas cover large areas, for example, the smallest emergency group call area will be that covered by three base stations, about 18 kilometres (approximately 11 miles).

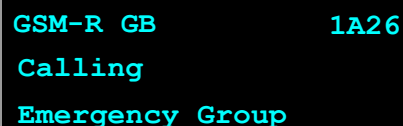
To make a railway emergency group call, you must press the railway-emergency group call (red) button.



- ① Once you have pressed the red button you will not be able to cancel the call being set up.

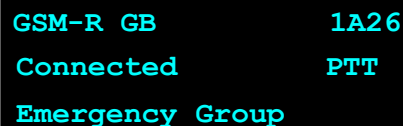
GSM-R user procedures (cab radio Version 2)

The cab radio shows that the railway emergency group voice call has been made and the red button 'flashes'.



GSM-R GB 1A26
Calling
Emergency Group

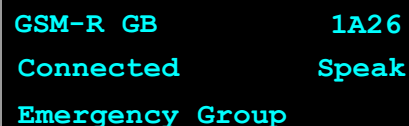
Once the call is made, you will hear an emergency annunciated warning tone from the loudspeaker for five seconds ("Connecting emergency group", when connected use press to talk). You should not start to communicate until the warning tone ends and you see the message PTT.



GSM-R GB 1A26
Connected PTT
Emergency Group

Once the call is connected, you must follow the emergency call procedure.

Press the PTT (when you see the prompt) and after the short confirmation tone of approximately one second, the cab radio will display "Speak". You can then pass your message.



GSM-R GB 1A26
Connected Speak
Emergency Group

You must release the PTT after passing your message in order to hear the signaller or allow another mobile user or signaller to speak – remember; PRESS TO TALK, RELEASE TO LISTEN.

Only the person making the call, or the signaller, should speak during the call. If you receive a railway emergency group call that has been made by another driver, you should only speak if asked to do so by the signaller or if you have something important to add about the emergency.

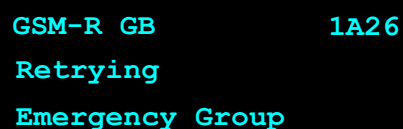
- ① If for some reason, another cab radio or handportable user has taken control of the voice connection to the signaller, you will not be able to speak until the other user releases their PTT. In this case, at the end of the short confirmation tone you will hear a 'busy' tone and see the message "busy" on the cab radio display. Holding down the PTT until the other user releases their PTT will not work. You have to release your PTT and press it again when you see the "PTT" prompt.

Only the person who made the call, or a signaller, can end the railway emergency group call once it has been initiated. However, once underway the emergency situation must be managed by the signaller and so should be terminated by the signaller.

- ① Returning the handset to the cradle will not end an emergency call, it will switch the speech from the handset to the loudspeaker.

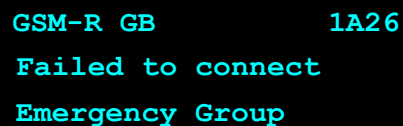
GSM-R user procedures (cab radio Version 2)

If the call cannot be made the cab radio will try again for up to 30 seconds.

A screenshot of a cab radio display showing the text "GSM-R GB" in the top left, "1A26" in the top right, "Retrying" in the center, and "Emergency Group" at the bottom. The text is cyan on a black background.

GSM-R GB 1A26
Retrying
Emergency Group

If the call is not connected after 30 seconds the display shows the following:

A screenshot of a cab radio display showing the text "GSM-R GB" in the top left, "1A26" in the top right, "Failed to connect" in the center, and "Emergency Group" at the bottom. The text is cyan on a black background.

GSM-R GB 1A26
Failed to connect
Emergency Group

If the railway emergency group call fails to connect you must use an alternative method of communication to contact the signaller.

7.3.7 Accidental use of the railway emergency group call

Instances occur from time to time where the (red) emergency group call button on a cab radio has been accidentally pressed and the initiator has failed to respond when the signaller answers. This may leave the signaller in a difficult position and unsure whether the call is a legitimate emergency and may have to instigate time consuming procedures to ascertain the reason for the call.

In the event of accidental use:

You must use the normal call process described above in section 7.3.4 and inform the signaller the button has been accidentally pressed. This will be greatly appreciated by the signaller.

Treat the red button as live at all times, and take care when in and about the driving cab.

7.3.8 Emergency (999/112) call

You should only make a 999 (or 112) emergency call as a last resort, if all other forms of emergency call to the signaller have failed. In an emergency you must first try to contact the signaller.

Use the keypad to dial '999' (or '112') as described in section 6.7. This type of call will be connected to the railway emergency operator.

7.3.9 Electrical Control Operator (ECO)

You can use the cab radio to call the ECO directly. There are four ways in which to make the call:

- by using the appropriate entry in the Network Rail phonebook (see section 6.6.2). or
- by dialling the short code: 1400. or
- select from the menu. or
- by dialling the full 8-digit fixed terminal number published in the Sectional Appendix.

GSM-R user procedures (cab radio Version 2)

However, in most circumstances your initial point of contact will be the signaller responsible for controlling the area where you are, so where necessary, you must arrange for the signaller to speak to the ECO on your behalf.

- ① The ECO may be listed twice in the phonebook, firstly under the name of the control room, for example Cathcart ECO, and secondly under 'ECR'.

7.3.10 Operations Controller

You can use the cab radio to call the Operations Controller directly. There are 4 ways in which to make the call:

- by using the appropriate entry in the Network Rail phonebook (see section 6.6.2). or
- by dialling the short code: 1300. or
- select from the menu. or
- by dialling the full 8-digit fixed terminal number published in the Sectional Appendix.

However, in most circumstances your initial point of contact will be the signaller responsible for controlling the area where you are, so where necessary, you must arrange for the signaller to speak to the Operations Controller on your behalf.

- ① The Operations Controller may be listed twice in the Phonebook, firstly under the name of the control office, for example, 'Scotland Operations Control', and secondly under 'Operations Control', for example, 'Operations Control Scotland'.

7.3.11 Driver to driver communication

You can only use driver to driver communication with the cab radio as shown in each operating company's policy or operating instructions. You must strictly follow those instructions.

The following are examples of where you may be authorised to use the driver to driver communication function:

- Locomotives coupled in tandem (each traction unit being separately controlled by its own driver, with through control of the automatic brake only).
- Working trains with locomotives at both ends (rear locomotive not applying traction power or braking except in an emergency).
- Assistance in the rear to failed locomotive-hauled or multiple unit trains.
- Locomotive assisting in the rear of a train (where banking authorised in the Sectional Appendix).
- Driving a traction unit from other than the leading driving cab (for example if the controls in the leading cab are defective).

7.3.11.1 Setting up driver to driver communication

Two options are available in setting up driver to driver communication:

Option 1 - uses the "Train Crew" call function in the menu.

GSM-R user procedures (cab radio Version 2)

Option 2 – uses the “Multiparty call” function in the menu.

The following text shows you how to set up driver to driver communication using both options.

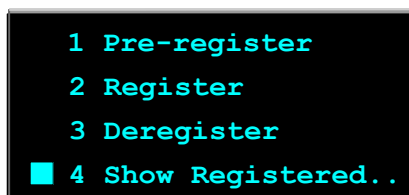
Note: Driver to Driver communications is the only procedure which requires an eight digit registration code

You and the other driver involved will need the following information:

- Five digit code for the combined train formation.

① This can either be obtained by selecting “Show Registered” in the Reg/Dereg menu or by contacting the signaller responsible for controlling the area.

- Location code, this must be a 99X code.



Before registering the cab radios, you must come to a clear understanding with the other driver as to who will be in charge of communicating with the signaller as the train goes forward (GSM-R ‘Lead Driver’).

Option 1 - Using the Train Crew Call function.


Before registering, the driver who has lead responsibility with the signaller must deregister any existing registration code and then register in the normal way using the agreed five digit registration and the location code.

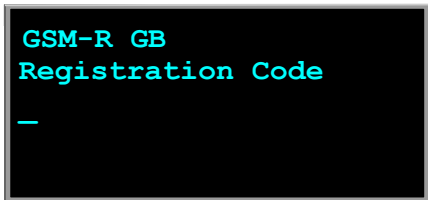
The other driver (GSM-R ‘Driver 2’) can then register either with a driver’s key on or not depending on circumstances; you must register via the menu:



or by choosing the menu items you need using the scroll buttons.

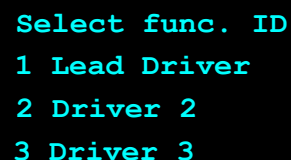
Enter the same registration identity as the Lead Driver using the keypad.

Press  to confirm entry of the information.

A screenshot of a black screen with cyan text. It says "GSM-R GB" on the first line and "Registration Code" on the second line. Below the text is a single horizontal line.

GSM-R GB
Registration Code
—


Once the registration code has been accepted, you will be prompted to choose the Driver 2 functional role, from a numbered list.

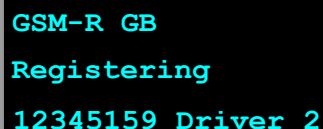
A screenshot of a black screen with cyan text. It says "Select func. ID" followed by "--" on the first line. Below are three numbered options: "1 Lead Driver", "2 Driver 2", and "3 Driver 3".

Select func. ID --
1 Lead Driver
2 Driver 2
3 Driver 3

GSM-R user procedures (cab radio Version 2)

Once you have chosen Driver 2 you must

press  to begin the registration process and send the registration identity to the GSM-R network.

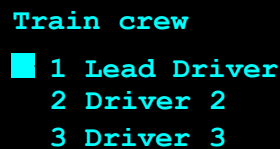


GSM-R GB
Registering
12345159 Driver 2

Registration now follows the same process as described in section 6.2.3.
Both registered cab radios should then display the correct TRN (headcode).

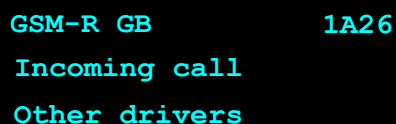
Once registered, the signaller will be able to communicate with each of the registered functional roles, for example; the signaller will be able to make a point-to-point call to the Lead Driver or Driver 2. Any registered members of train crew will also be able to use the GSM-R equipment to communicate, by making a point-to-point call to the necessary functional role. For example, the lead driver will be able to call driver 2 or vice versa.

The Lead Driver and Driver 2 can call each other using the menu function, for example, the Lead Driver could call Driver 2 ('Calls', 'Other calls', 'Train crew', 'Driver 2').



Train crew —
■ 1 Lead Driver
2 Driver 2
3 Driver 3

Driver 2 will see the following display.



GSM-R GB 1A26
Incoming call
Other drivers

If you attempt to call the other driver before the driver has registered the cab radio you will get a failure message as shown below.



GSM-R GB 1A26
Failed to connect

Give the other driver chance to register the cab radio before trying again.

Once the call is made, it is possible for the Lead Driver to put Driver 2 on hold (see section 7.4.1) and a call to the signaller (using the phonebook or key pad dialling but not 'call signaller' button). Before putting another user on hold you must tell them that you are about to put them on hold. When retrieving a call that you have put on hold you must identify yourself again to the other user.

When one cab mobile puts another on hold the display will show "Call held" for five seconds. If it is retrieved by another radio then "Held call retrieved" is shown temporarily.

GSM-R user procedures (cab radio Version 2)





Once the Lead Driver ends the call to the signaller, the cab radio will automatically retrieve the held call (Driver 2) and the two drivers can then use the GSM-R system to communicate.

- ① The cab radio allows the receiving party to replace the handset on its cradle and operate in 'hands-free mode'. So, if assistance to a failed train movement is authorised, then, for example; the driver in control of power and brake at the rear can receive instructions over the loudspeaker from the driver controlling the train movement at the front. However, the behaviour is different for the call initiator as replacing the handset onto the cradle will terminate the call.
- ① If the GSM-R system is being used to control the movement of a train and during the movement communication is lost or interrupted, for any reason, then the driver in control of the train brake must immediately stop the movement and not restart until communication has been re-established and it is safe to do so.

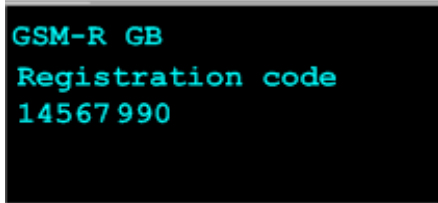
GSM-R user procedures (cab radio Version 2)

Option 2 – Using the Multiparty Call function

Driver 1. The driver who has lead responsibility for communicating with the signaller must obtain the 99x wildcard location code and the five digit journey code from the signaller. This driver can then register through the menu using the agreed five digit registration and the three digit wildcard location code.

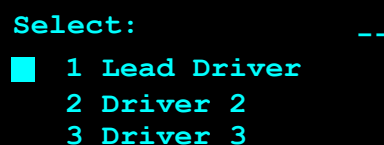
Use  ,  ,  ,  or by choosing the menu items you need using the scroll buttons.

This registration must be done through the menu; any other method will request the alpha-numeric head code to be input.



```
GSM-R GB
Registration code
14567990
```





After entering the 8-digit registration code, you will now have a choice to select Lead Driver.




```
Select:      --
1 Lead Driver
2 Driver 2
3 Driver 3
```

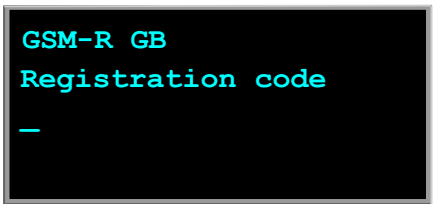
Driver 2. The other driver (GSM-R 'Driver 2') can then register either with a driver's key on or not depending on circumstances.

- ① This registration must be done through the menu, any other method will request the alpha-numeric head code to be input.

Use  ,  ,  ,  or by choosing the menu items you need using the scroll buttons.

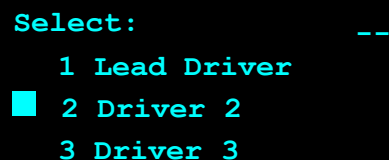
Enter the same registration identity as the Lead Driver using the keypad.

Press  to confirm entry of the information.



```
GSM-R GB
Registration code
—
```

Once the registration code has been accepted, you will be prompted to choose the Driver 2 functional role, from a numbered list.



```
Select:      --
1 Lead Driver
2 Driver 2
3 Driver 3
```


GSM-R user procedures (cab radio Version 2)

Once you have chosen Driver 2 you must press



to begin the registration process and send the registration identity to the GSM-R network.

Select: --
1 Lead Driver
2 Driver 2
3 Driver 3

When registered this display will show

GSM-R GB 1A51

Dv2

To connect the two radios together, the Lead Driver makes a Multiparty call by selecting 'Build Multiparty' from the 'Calls', 'Other Calls' menu.

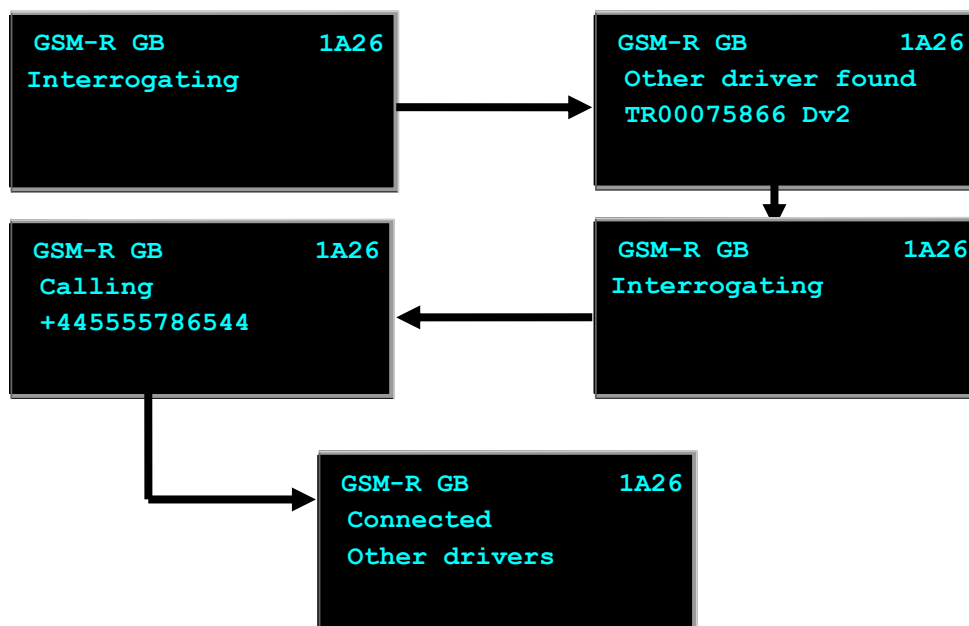
❶ Only the Lead Driver can initiate this call.

1 Build Multiparty
2 Train Crew
3 Group Call
4 Broadcast Call

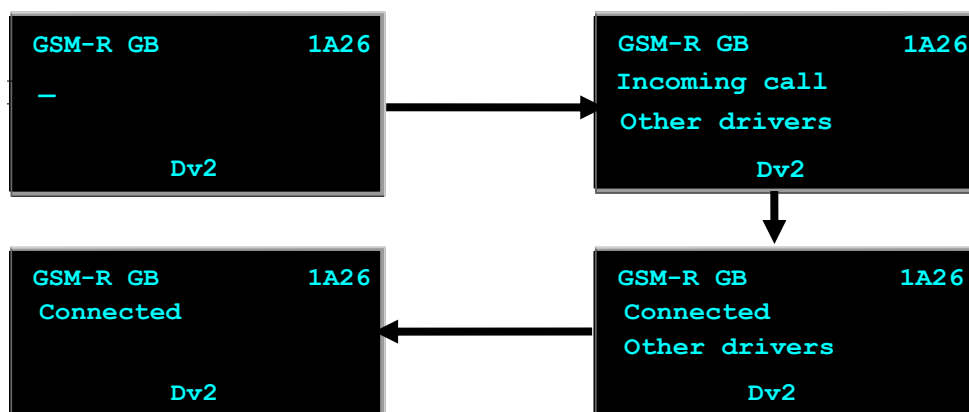
The cab radio will then interrogate the system to find any other drivers registered to the same 8-digit registration code and connect them to the Lead Driver's cab radio. The following screen shot diagrams show examples of a typical interrogation process as seen by Driver 1 and an incoming call for Driver 2.


GSM-R user procedures (cab radio Version 2)

Driver 1 Multiparty interrogation process



Driver 2 Receiving a call



- ① Either the Lead Driver or Driver 2 can return their handset to the cradle and switch the incoming speech to the cab loudspeaker, ie enter hands-free mode.
- ① To end the call press .

GSM-R user procedures (cab radio Version 2)

7.4 Handling several calls (call holding, call waiting, call pre-emption)

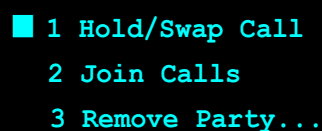
You may put an existing call on hold to make another call or to answer another incoming call.

- ① You have the option to put a point-to-point call on hold to answer another incoming call. However, an incoming call of a higher priority may be answered automatically, which will end an ongoing call (pre-emption).

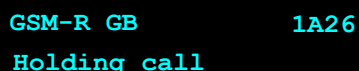
7.4.1 Putting a point-to-point call on hold

Before putting another user on hold you must tell them that you are about to put them on hold.

To put a call on hold choose the function 'Hold/Swap call' from the in call menu, press

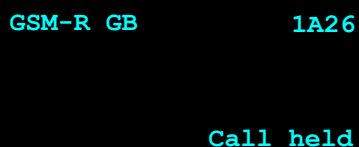
A screenshot of a black screen with cyan text. It shows a menu with three options: '1 Hold/Swap Call', '2 Join Calls', and '3 Remove Party...'. A small cyan square is visible to the left of the first option.

```
■ 1 Hold/Swap Call
  2 Join Calls
  3 Remove Party...
```

A screenshot of a black screen with cyan text. It shows 'GSM-R GB' and '1A26' on the top line, and 'Holding call' on the bottom line.

```
GSM-R GB      1A26
Holding call
```

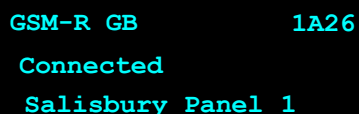
Once the call is on hold, the cab radio displays a reminder message.

A screenshot of a black screen with cyan text. It shows 'GSM-R GB' and '1A26' on the top line, and 'Call held' on the bottom line.

```
GSM-R GB      1A26
Call held
```

7.4.2 Another party putting you on hold

- ① If you are put on hold by the signaller, the only indication you will receive is the 'on-hold' tone.

A screenshot of a black screen with cyan text. It shows 'GSM-R GB' and '1A26' on the top line, 'Connected' on the second line, and 'Salisbury Panel 1' on the third line.

```
GSM-R GB      1A26
Connected
Salisbury Panel 1
```

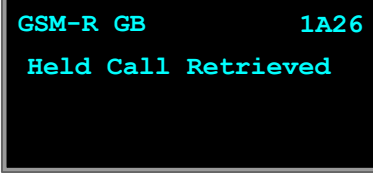
- ① If you are put on hold by another cab radio user then you will not receive any permanent indication. The display will show for five seconds only.

A screenshot of a black screen with cyan text. It shows 'GSM-R GB' and '1A26' on the top line, and 'Call Held' on the bottom line.

```
GSM-R GB      1A26
Call Held
```

GSM-R user procedures (cab radio Version 2)

When you are retrieved by another party the display will inform you the call is being retrieved. The display will show for five seconds only.



GSM-R GB 1A26
Held Call Retrieved

GSM-R user procedures (cab radio Version 2)

7.4.3 Reconnecting a held call

When retrieving a call that you have put on hold you must identify yourself again to the other user.

To retrieve a call that is on hold, choose 'Retrieve Call' from the main menu press



7.4.4 Swapping between an active call and a held call

When you have an active call and another call on hold, you can simply swap between the two calls by choosing 'Hold/Swap call' from the in-call menu:

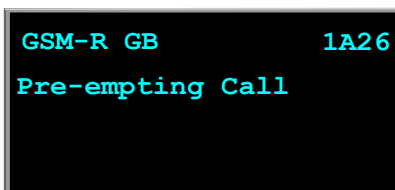


The cab radio will display information about the call which is currently active. Remember to advise all parties of what you intend to do.

A held call will automatically be retrieved if the currently connected call is ended by either person.

7.4.5 New incoming call

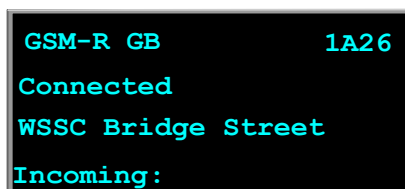
If you receive another call of a higher priority than your ongoing call (for example, if you are in a call with maintenance control when the signaller calls you with an Urgent priority) the ongoing call will end in favour of the incoming call of a higher priority. The new call will be handled in the normal way.



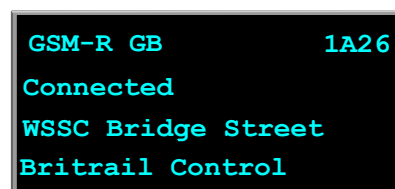
GSM-R GB 1A26
Pre-empting Call

If your ongoing call is pre-empted you must listen to the information provided by the signaller and act accordingly before attempting to re-establish your original call.

If you receive another call that is of an equal or lower priority, you will hear a 'call waiting' tone and the lower display alternating at one second intervals between "incoming" and (up to a) 20 character caller identity. The call waiting tone is repeated at 4 second intervals.



GSM-R GB 1A26
Connected
WSSC Bridge Street
Incoming:



GSM-R GB 1A26
Connected
WSSC Bridge Street
Britrail Control

7.4.6 Answering a waiting call


You can answer a waiting call in two ways, either by ending the ongoing call or placing the ongoing call on hold (see section 7.4.1) and accepting the new call. Either way will lead to the second call being automatically answered.

GSM-R user procedures (cab radio Version 2)


7.5 Sending operational text messages

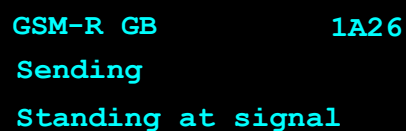
7.5.1 Standing at signal

You must normally use the standing at signal operational text message to remind the signaller about the presence of your train when standing at a signal at danger.

The cab radio allows you to do this by simply pressing the  button.

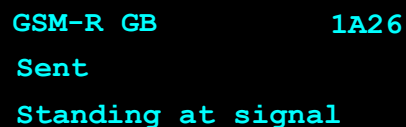
- ① You must only use this function at signals not displaying a fixed terminal 8-digit number or 12nn short code number (see 4.4). In these areas you must contact the signaller using a point-to-point call.

Pressing  sends the message to the signaller.




GSM-R GB 1A26
Sending
Standing at signal

The cab radio will show "Sent" when the message is delivered.



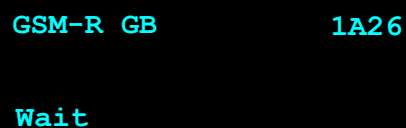
GSM-R GB 1A26
Sent
Standing at signal

The confirmation message will be displayed until you either press  or you receive an incoming call or message.

When the signaller receives a 'standing at signal' message they have the following options:

7.5.1.1 Wait message

When the signaller acknowledges that they have received the 'standing at signal' message, they may tell you to wait for a change of aspect by sending the text message, 'Wait'.



GSM-R GB 1A26
Wait

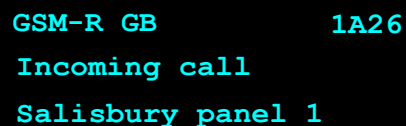
This 'wait' message shows that the signaller knows you are there and that you should wait for a change of aspect or further instructions.

Press  to clear the display of the 'wait' message.

GSM-R user procedures (cab radio Version 2)

7.5.1.2 Signaller calls driver


The signaller could make a point-to-point voice call to you, to pass specific information, for example, authority to pass the signal at danger.



GSM-R GB 1A26
Incoming call
Salisbury panel 1

7.5.1.3 Signaller clears signal

The signaller could clear the signal. In this case you will not receive any further communication.

Press  to clear the display of the 'standing at signal' message.

7.5.1.4 If the signaller does not respond

If you receive no response from the signaller, and the signaller has not cleared the signal within a reasonable period, you must make a voice call to the signaller.

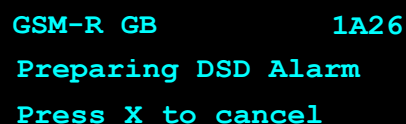
7.5.2 DSD alarm message

If you release the DSD with the master switch in Forward or Reverse, after 1 minute the radio will send a DSD Alarm message to the signaller to let him/her know that you may need assistance.


- ① If at any time you are required to vacate the cab to perform other duties, ensure the master switch is not left in the Forward or Reverse position to avoid sending spurious DSD alarms to the signaller.

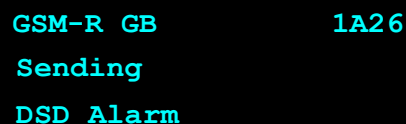
30 seconds after the DSD has been released, the radio will prepare to send the DSD alarm.

The cab radio will sound a continuous audible alarm and display a message to this effect for a further 30 seconds.



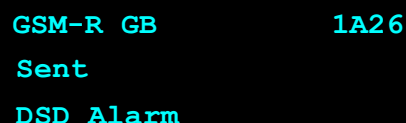
GSM-R GB 1A26
Preparing DSD Alarm
Press X to cancel

The DSD Alarm message will be sent to the signaller at the end of this period unless the DSD is reset or you press the cancel button  on the cab radio.



GSM-R GB 1A26
Sending
DSD Alarm

The cab radio confirms that the message has been sent to the signaller.




GSM-R GB 1A26
Sent
DSD Alarm

GSM-R user procedures (cab radio Version 2)

- ① The total duration between releasing the DSD and the alarm being sent is 1 minute; this is the same as existing CSR radios.

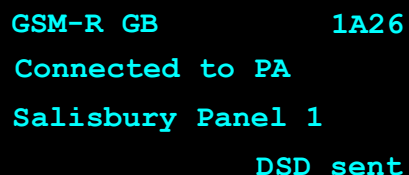
If transmission of the DSD alarm message fails, the cab radio will try again up to two times after which time an appropriate failure message will be displayed.

A screenshot of a GSM-R display showing the text "GSM-R GB" and "1A26" in the top right corner. Below this, the word "Failed" is displayed in a larger font, and "DSD Alarm" is displayed below that.

After receiving the DSD alarm message the signaller is likely to respond by making an urgent point-to-point call to your train. If this gets no response, the signaller will make a PA announcement to your train (where the PA is connected to the cab radio).

The PA announcement allows the signaller to pass information to those travelling on a specific train and to seek assistance for you if he or she believes you may be incapacitated.

When the cab radio receives an incoming PA call, the display will be similar to that described in section 7.1.1. However, once the call is connected, the display will show that the call is connected to the PA.

A screenshot of a GSM-R display showing the text "GSM-R GB" and "1A26" in the top right corner. Below this, the text "Connected to PA" is displayed, followed by "Salisbury Panel 1" and "DSD sent" in the bottom right corner.

The signaller will make the following announcement.

“Ladies and gentlemen, due to operating difficulties there is likely to a short delay to your service. In order to assist the driver, will any railway staff travelling on the train please make themselves known to the train driver. Further information will be given shortly.”

If you can respond you must wait until the announcement has finished and the call to the PA terminated. If you need to speak to the signaller about the announcement, you must make a separate point-to-point call to the signaller.

8 Shunting mode

8.1 Introduction

Shunting mode is a particular mode of operation where the GSM-R cab radio communicates direct with other GSM-R radios operating in shunting mode by using special group calls. There are no applications of Shunting Mode available in the UK at this time; hence this mode is not yet covered by these User Procedures.

9 Troubleshooting guide

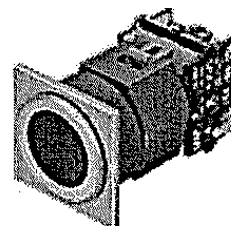
This section describes the action that you can take to identify and overcome possible problems associated with the GSM-R cab radio.

9.1 Losing the main power supply (back-up battery arrangements)

If the main power supply to the traction unit is interrupted, for any reason, the cab radio can continue to operate from the vehicle batteries. *Back-up switch*

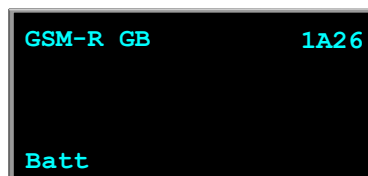
Once the vehicle batteries have run out, or if the batteries have been isolated, continued operation of the cab radio depends on whether the radio has a GSM-R back-up battery installed.

If a GSM-R back-up battery has been fitted, power will automatically be provided for up to two hours. If the cab radio was powered down and needs to be switched on without a vehicle battery supply, you will need to operate the GSM-R battery back-up switch and power up the cab radio as described in section 6.1.2.



If the cab radio drivers control panel was powered on, then the cab radio will automatically switch to the back-up battery.

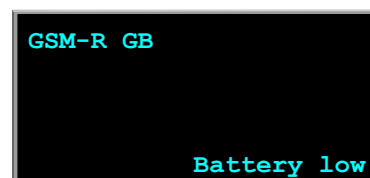
When the radio is operating on the back-up battery then this will be shown on the cab radio display by the 'Batt' indication. If the back-up battery is running low, you will hear a single alert tone and the 'Batt' indication will flash.



- ① The 'Batt' indicator flashing tells you that you have approximately 10 minutes of remaining.

If the back-up battery has become fully discharged through use, the next time the radio is switched on (assuming the batteries are still discharged) a 'Battery low' indication will be seen on the display.

This message will continue to be displayed until the battery has charged to a serviceable level, and the driver's key has been removed and re-inserted or the test button is pressed, for example, if the battery has charged up enough during a journey, when the key is re-inserted or the test button is pressed, a battery presence test will occur and clear the previous warning if sufficient voltage is detected.



- ① When the 'Battery low' indication is shown the cab radio is fully functional but the presence of the indication should be reported if it does not clear before the end of the journey.

GSM-R user procedures (cab radio Version 2)

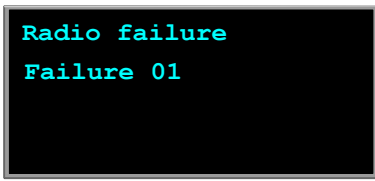
9.2 If the radio does not power up correctly

9.2.1 Power-up self-test failures

If the cab radio fails the power-up self-test, you will see a failure message. We split failures into service affecting and non-service affecting.

9.2.2 Service-affecting failures

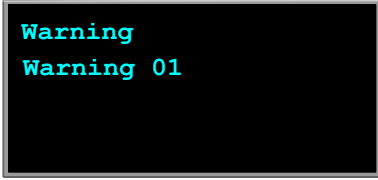
Service-affecting failures are shown as a 'Radio failure' followed by a number which identifies the type of failure to the maintainer. This type of failure means the cab radio will not work and needs maintenance attention. This type of failure should be reported to the signaller.



```
Radio failure
Failure 01
```

9.2.3 Non-service-affecting faults

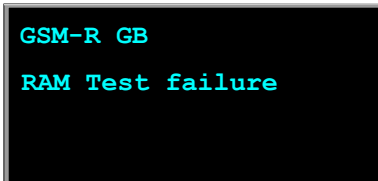
Non-service-affecting faults are identified by a 'Warning' followed by a number which identifies the type of fault to the maintainer. This type of fault means that the cab radio will work, but may be limited in what it can do. This type of fault should be reported to your train operator's control.



```
Warning
Warning 01
```

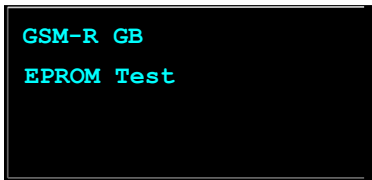
9.2.4 Start up failure of Drivers Control Panel (DCP)

When the drivers control panel first initialises, it performs an internal self check. In the event of failure the display will show either of these failure messages.



```
GSM-R GB
RAM Test failure
```

Either of these messages cannot be cleared and will stay as a permanent message on the screen.



```
GSM-R GB
EPROM Test
```

If either of these messages are displayed they must be treated as a service affecting failure as explained in section 9.2.2.


9.2.5 Cancelling fault messages

If the failure message relates to a service affecting failure you cannot remove this from the cab radio display and the radio should be treated as a failure. With certain failure types

GSM-R user procedures (cab radio Version 2)

the cab radio will attempt to reboot five minutes after displaying the failure. It is permissible to manually re-boot the radio (when safe to do so), to attempt to clear the fault. These types of faults must be reported.

- ① If attempting a manual re-boot by tripping and re-setting the cab mobile circuit breaker; if a battery back up is fitted, the drivers control panel must be switched off first.

If the fault message relates to a non-service affecting fault, your train will be allowed to enter or remain in service. However, you will need to acknowledge the fault message by pressing . A reminder of this fault will remain on the display until the radio is switched off.

9.2.6 If the cab radio does not find the network

If the cab radio fails to find the GSM-R GB network in an area that normally has coverage, you should first try to establish whether there is a network problem at your location (if you have not already been informed by your control or in a broadcast from the signaller).

If you are able, try checking the rear cab mobile, if this also fails to find the network the likelihood is a network failure.

In this circumstance you must contact the signaller controlling the movement of your train and if there has been no report or confirmation of coverage problems at your location you should treat the cab radio as defective and follow the process identified in your company's contingency plan.

9.2.7 The radio connects to the wrong network

If you are using the GSM-R cab radio in Great Britain, it should default to the 'GSM-R GB' network. However, in the unlikely event that it logs on to another network, you can choose the GB network manually. You can select the GSM-R GB network using the menu: 'Settings', Select network'

, ,  and choose the GSM-R GB network from the list.

9.2.8 Cab radio displays foreign language

The radio will normally use English when powered up. If the previous user has changed the language and the cab radio has been switched off but not powered down, it may display a foreign language. In this case you can set the language to English again using the menu short cut.

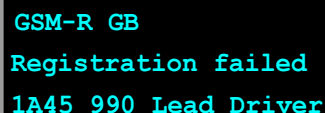
, , , 

GSM-R user procedures (cab radio Version 2)

9.3 Registration problems

9.3.1 Registration failure

If the message 'registration failed' is displayed after trying to register the cab radio, you should check the registration code was entered correctly by attempting to register the cab radio for a second time.



GSM-R GB
Registration failed
1A45 990 Lead Driver

If you are still unable to register the cab radio then you must contact the signaller.

The signaller may know about a particular problem that may be causing registration failures. One problem that might cause your registration to fail is the failure of signalling system-based call routing. In this case the signaller will give you a location code in the form of a '99x' wild card number. This will overcome this problem. In this case, you can use your original TRN together with the 99x location code to register the radio successfully.

- ① The 'wild card' 99x number should only be used when prescribed in these user procedures or by a signaller, as the use of this function removes safeguards against registering with the wrong TRN.

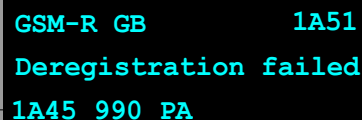
9.3.2 Cab radio failed to de-register from previous journey

If the cab radio has failed to deregister from the previous journey then you will not be able to register a new TRN. If the previous TRN or the registration code is shown in the train number field, attempt to deregister this first. If this fails, or no number is present and the correct registration fails twice, contact the signaller to report the problem.


- ① The signaller may be able to identify a 'stuck registration' on his/her fixed terminal. It may be possible to register to the exact same registration code (provided the train is standing at the same signal as the previous train) and then deregister it. Otherwise, the signaller will report this as a fault to be cleared by the network technicians.

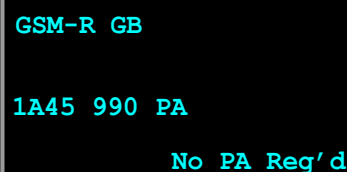
9.3.3 PA registration failure

If during registration the cab radio displays 'Deregistration failed, PA', then the signaller will not be able to initiate a call to the train's PA system.



GSM-R GB 1A51
Deregistration failed
1A45 990 PA

- ① If  is pressed the display will show "No PA Reg'd".



GSM-R GB
1A45 990 PA
No PA Reg'd

In these circumstances you must deregister and attempt to re-register the cab radio. If the fault persists then you must report it to the signaller and await further instructions.

GSM-R user procedures (cab radio Version 2)

- ① The signaller may be able to clarify that the PA is shown on the fixed terminal and will therefore be able to call the PA.

9.3.4 Wrong train reporting number displayed

If the train TRN displayed on the cab radio is not correct, deregister this number and try registering again, with the same code. If this still returns an incorrect TRN, you must deregister the TRN and contact the signaller controlling the movement of your train for advice.

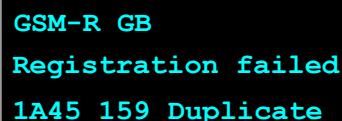
If the correct TRN is not shown, you must contact the signaller to check that your TRN is shown on the signaller's fixed terminal. If the signaller confirms the correct TRN is displayed, you may treat the radio as being correctly registered.

If the correct train TRN is not shown on the signaller's fixed terminal, you must treat the registration as failed.

9.3.5 Duplicate registration identity

If the registration code is already in use by another cab radio, the network will reject your registration and the message 'duplicate' will appear on the display. After checking that you have entered the correct seven digits, you must contact the signaller controlling the movement. The signaller will instruct you to use a 99x wild card location code which should enable you to register successfully.


If your first attempt to register that led to a 'duplicate' used a '99x' then advise the signaller of this and the signaller will provide an alternative '99x' to use.



GSM-R GB
Registration failed
1A45 159 Duplicate

- ① You can contact the signaller by calling them using the cab radio. However, because the radio is not registered, you will need to find the number in the phonebook (see section 6.6.2) or dial the signaller's full number or the 12nn short code, if you have access to it.

The registration code with the new 99x location code included can be entered whilst you are still involved in the call with the signaller.

Press the  button again and enter the registration code by pressing the appropriate number keys, the digits will appear on the display and the registration process will be automatically completed, once the call to the signaller is terminated.

If registration is still not possible but the radio is otherwise functioning correctly you must report the problem to the signaller and follow the instructions that the signaller gives you.


9.3.6 Pending registration (trying to register if there is no coverage)


If you need to register the cab radio in a GSM-R area at a time when coverage is not available due to network problems, you can set up the cab radio with the registration code and it will automatically start the registration process once coverage is re-gained. However, you will need to use the wild card 99X location code in order for the registration process to be successful when you get network coverage again. Using the signal identity

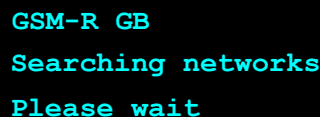
GSM-R user procedures (cab radio Version 2)

will lead to a registration failure when coverage is regained as the train may no longer be at that signal.

- ① Pending registration is not available when you register through the menu.

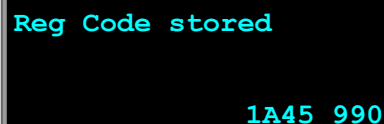
Press  on the cab radio.

Then press  to attempt to send the registration code to the GSM-R network.



GSM-R GB
Searching networks
Please wait

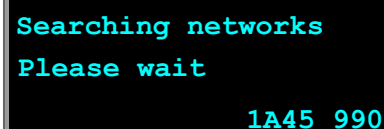
If GSM-R network coverage is not available, the cab radio will automatically store the registration code.



Reg Code stored

1A45 990

After five seconds, the 'Reg ID saved' message is cleared and replaced by a 'Searching networks – Please wait' message. This message will continue until GSM-R coverage is found, at which point the cab radio will automatically complete the registration process.



Searching networks
Please wait

1A45 990

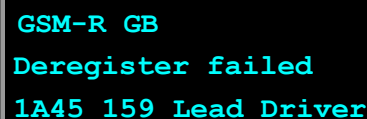
You can cancel the pending registration state by pressing  at any time.

9.3.7 Loss of registration

If the cab radio's registration is lost at any time, then you must re-register the cab radio at the first suitable opportunity and report the event to the signaller.

9.3.8 Failure of the cab radio to de-register

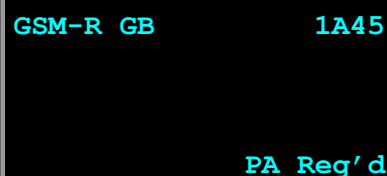
If the cab radio fails to deregister, first of all try again. If the cab radio again fails to deregister contact the signaller (this might not be possible using the cab radio) and report the failure.



GSM-R GB
Deregister failed
1A45 159 Lead Driver


9.3.9 Failure of the Public Address to de-register

If the PA fails to deregister and this is not observed by the driver when closing the desk, then the next driver to put a driver's key on will see the following display.



GSM-R GB 1A45

PA Reg' d

The driver can attempt to deregister the 'stuck PA' registration using the  button. If this fails, then the fault should be reported to the signaller as a registration failure.

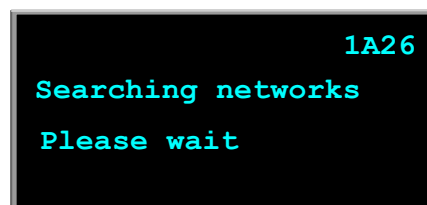
GSM-R user procedures (cab radio Version 2)

- ① The radio will attempt to de-register the stuck registration when the drivers control panel is re-activated.

9.4 Temporary loss of coverage

Although the GSM-R system provides full coverage of the rail network, there may be times when there is a temporary break in coverage, for example a base station fault. There will be a warning tone sounded through the loudspeaker and a message 'searching networks please wait' on the display.

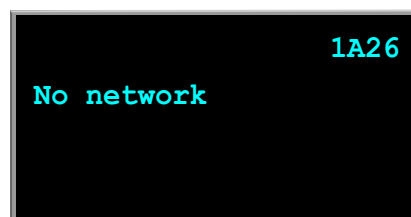
If there is a break in coverage you should report it to the signaller at the next appropriate opportunity (in other words, when it is safe to do so), unless you have previously been advised of the coverage loss.



9.4.1 No Network message

This message only appears in version 2 software when the radio attempts to connect to the network and either:

- Receives a corrupted or un-intelligible message or
- Receives no response at all.
- Is denied access.



If the train is in transit and it comes onto a cell which is allowed it will normally automatically rejoin the last network it was on. If it is unable to establish the last network it was on for some reason (eg corruption above) then the user may have to manually reselect the network through the menu.

However, if the radio is on an "allowed" cell (display showing GSM-R GB) and then reselects to an "unallowed" cell, it gets response from the network to say it [the radio] is not allowed to connect to the network then in this scenario it will display "searching networks please wait" (See section 9.4) until it reselects to an "allowed" cell where it will show the network name again,

9.5 Loss of signalling-system based call routing

The cab radio will not be aware of network problems that affect signalling-system based call routing. However, if the fault has been reported to the signaller you should receive a broadcast call from the signaller alerting you to the fault when entering the failure area.

If you receive a broadcast (or other communication) informing you of such a failure you should treat the area as a 'dial-up' area (as described in section 2.5) and only contact the

GSM-R user procedures (cab radio Version 2)

signaller by dialling the signaller's number, 12nn number, phonebook, sectional appendix or periodic operating notices (PON).

- ① Under such circumstances calls will be routed to the nominated signaller who may not be the controlling signaller and hence appear to be 'misrouted'. Always check the display to be sure which signaller has answered the call, and report any instances of 'misrouted' calls.
- ① You will need to pre-register the cab radio using the special "wild card" 99X location code (as described in section 6.2.4).

9.6 Call failure and dropped calls

Any instances of call failures and dropped calls (calls terminated unexpectedly that are not as a result of pre-emption) must be reported to the signaller at an appropriate time, when it is safe to do so.

9.7 Checking if the radio can make and receive calls (echo call test)

If you believe that the cab radio may be having problems making and receiving calls, you can check this by making an 'echo call' to the network. To make an echo call, dial '1900' using the keypad. Record a short message then wait a few seconds and your recorded message should be played back to you.

- ① The Network Rail phonebook will also include an entry for the echo call test number, that is, 'echocall' (see section 6.6.2).

9.8 Manually testing the cab radio (maintenance tests)

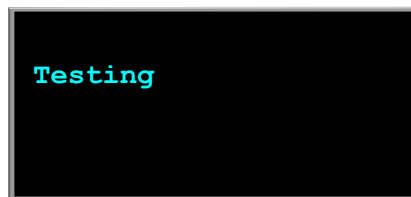
The cab radio has a number of built-in tests. These would normally be carried out by the maintainer but may help you identify suspected problems. You can use the tests as follows.

9.8.1 Using the test button



At any time while the cab radio is not being used, you can check whether the cab radio is working, using the **T** button.

Once you press the **T** button, a message will be displayed confirming that the self-test has started.



GSM-R user procedures (cab radio Version 2)

At the end of the self-test, you will see the results.



The 'Test OK' message will automatically be deleted from the display after five seconds..If the test fails, a message 'Test failed' will be shown together with a list of the failed test details. These will be indicated as described in section 9.2.1.

If any of the tests are considered fatal (shown as "Failure"). The cab radio will become inoperable until the problem is resolved by maintenance.

9.8.2 Tests available through the menu

Within the menu options are an additional layer of tests that can be accessed by all users, but are more likely to be used by those responsible for maintenance.

To access the maintenance menu select , 

The following test options are available.

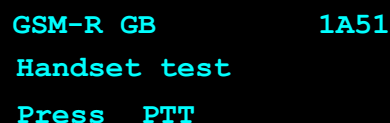
9.8.2.1 Option 1 - Fault-code help

Menu available with information for maintainers use only.

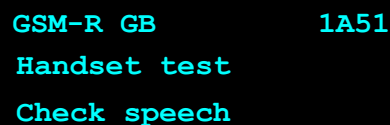
9.8.2.2 Option 2 - Handset test


The handset test allows you to check that the handset is working and that the PTT button is working.

Once you have chosen the handset test, the display will show that the test may begin and you are asked to press the PTT.



The cab radio display will ask you to speak.




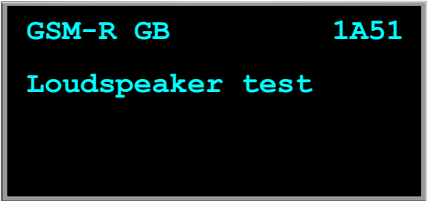
Press the PTT and speak into the handset microphone. Speech is relayed through the handset earpiece and you can listen to check whether the handset is working. Once you are satisfied that the handset test has been successful, press .

GSM-R user procedures (cab radio Version 2)

9.8.2.3 Option 3 - loudspeaker test

The loudspeaker test allows you to test the cab radio's loudspeaker.

Once you have chosen the loudspeaker test, you will hear a tone through the loudspeaker. You can cancel the test by pressing  and the tone ends.



A screenshot of a black screen with cyan text. The top line reads 'GSM-R GB' on the left and '1A51' on the right. The second line reads 'Loudspeaker test'.

9.8.2.4 Option 4 - Button tests

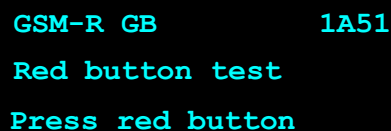
To select which button to test; two sub options are available:

- a – Red button test (To allow you to test the railway emergency group call button without actually making a call.)
- b – Yellow button test (To allow you to test the urgent call button without actually making a call.)

GSM-R user procedures (cab radio Version 2)

a) Red Button Test

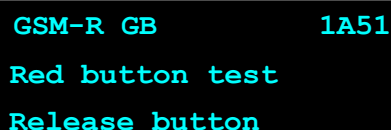
Once you have chosen the 'red button test', the display changes to show that the test may begin and you are asked to press the 'Emergency' button.



GSM-R GB 1A51
Red button test
Press red button

- ① You have up to 30 seconds in which to press the button or the test will fail.

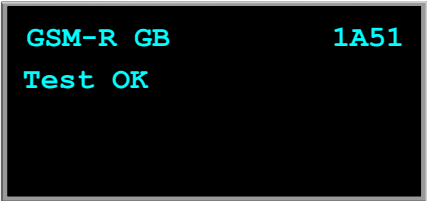
If the cab radio detects that the 'railway-emergency group voice call' button has been pressed, the display will change to ask you to release it. If not, a failure message will be displayed.



GSM-R GB 1A51
Red button test
Release button

- ① You have up to 30 seconds in which to release the button or the test will fail.

If the radio detects that the railway emergency group call button has been successfully released, it will produce a suitable message. If not it will display a failure message

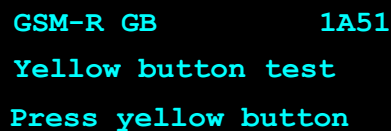


GSM-R GB 1A51
Test OK

b) Yellow button test

The 'yellow button test' allows you to test the 'urgent call' button, without actually making a call.

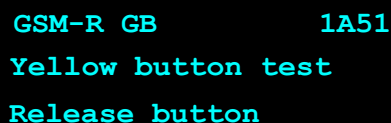
Once you have chosen the 'yellow button test', the cab radio display will show that the test may begin and you are asked to press the 'urgent priority' call button.



GSM-R GB 1A51
Yellow button test
Press yellow button

- ① You have up to 30 seconds in which to press the button or the test will fail.

If the cab radio detects that the 'urgent priority' call button has been pressed, the display will ask you to release the button.



GSM-R GB 1A51
Yellow button test
Release button

GSM-R user procedures (cab radio Version 2)

- ① You have up to 30 seconds in which to release the button or the test will fail.

If the cab radio detects that the 'urgent priority' call button has been released then 'Test OK' will be displayed. If not a failure message is displayed.

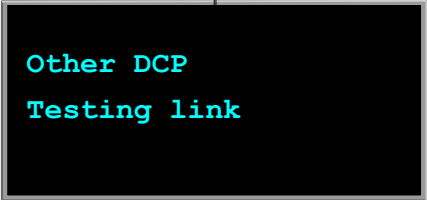


GSM-R GB 1A51
Test OK

9.8.2.5 Option 5 - Attached systems test

This test allows you to test the link to all attached systems, for example, an OTDR.

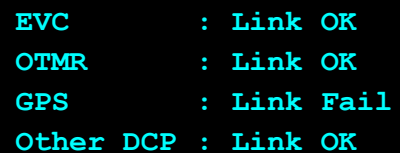
Once you have chosen the attached systems test, the cab radio tests the connection with all attached systems.



```
Other DCP
Testing link
```

If the test is successful, a 'Link OK' message is displayed for two seconds and then the next system is tested.

If the test is not successful, the message 'Test failed' is displayed followed by a list of the failed tests.



```
EVC      : Link OK
OTMR     : Link OK
GPS      : Link Fail
Other DCP : Link OK
```

- ① It is not unusual for no systems to be attached, in this case the cab radio display will show "No systems attached".

9.8.2.6 Option 6- PA Tests

The PA speech test allows you to test the train's PA system. Two sub menu options are available:

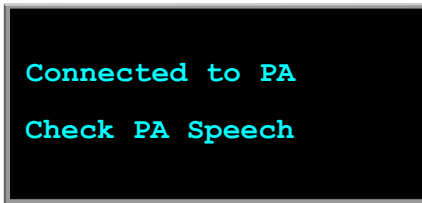
a) PA Tone Test

This test sets up a repeating tone to allow all PA speakers in the train to be tested by walking through the train without the need for a second person. This test is used by maintenance personnel.


b) PA Speech Test

This test allows speech to test the PA as follows:

After selecting "PA Speech Test" in the sub menu, you can now speak into the handset microphone and should be heard clearly over the train's PA system. You will need a second person to walk through the train to see that the system is working correctly.



Connected to PA
Check PA Speech

Once you are satisfied that the PA test has been successful, you can stop the test by pressing .

- ① If a PA system is not attached to the cab radio, for example, on trains not used in Driver Only (DO) passenger service, you will hear a tone and see an error message (No PA attached) displayed.

9.8.2.7 Option 7 Version Information

Used by maintainers. Provides a sub menu offering options to display various version information about the radio.

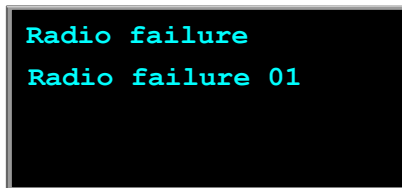
9.8.2.8 Option 8 Fault Log

Used by maintainers. Displays a list of the last 50 fault events.

9.8.2.9 Background testing

As well as the tests above and the automatic self-test during radio power up, the cab radio often checks itself. It will report any failures immediately on the active display.

If a fault relates to a service affecting failure (see section 9.2.2) the display will show a 'failure' message, accompanied by a fault code.

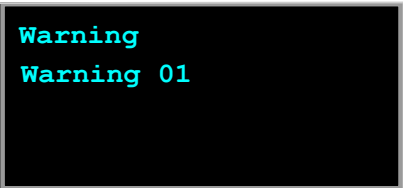


Radio failure
Radio failure 01

GSM-R user procedures (cab radio Version 2)


- ① You cannot delete these service affecting failure messages, as the cab radio can no longer be used. You must report all service affecting failures to the signaller and act on the instructions that you are given.
- ① If the “Radio Failure 01” appears the radio will automatically re-boot after five minutes to try and clear the fault. Alternatively you may re-boot the cab radio manually when safe to do so, using the GSM-R MCB. (The drivers control panel must be switched off if battery back up is fitted).

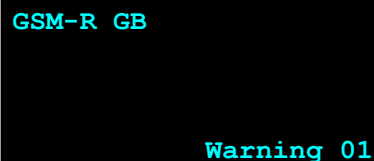
If the fault relates to a non-service affecting fault, the cab radio will display a ‘Warning’ message, accompanied by a fault code (see section 0).



Warning
Warning 01

- ① You cannot delete non-service affecting warning messages from the display. You must report all non-service affecting faults to your train operator control.

Pressing  clears the message and the warning message is placed in the reminder field until the radio is switched off.



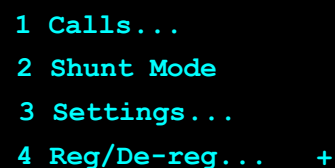
GSM-R GB

Warning 01

9.9 Call divert accidentally left on

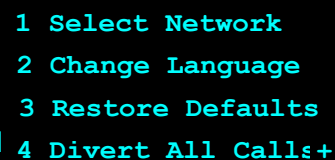
If a call divert has been set up and left activated, then the driver's display will show this when it is switched on. The screen will display “Calls divert to” followed by the phone number that the calls will be diverted to. You must cancel any call divers before entering service. This is done through the menu.

To cancel the divert, select menu 3 ‘Settings’



1 Calls...
2 Shunt Mode
■ 3 Settings...
4 Reg/De-reg... +

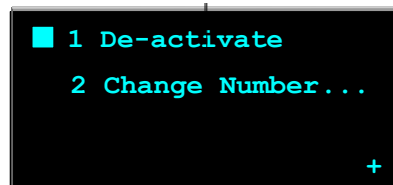
Select sub level menu item 4 ‘Divert All Calls’.



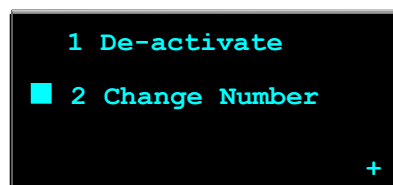
1 Select Network
2 Change Language
3 Restore Defaults
■ 4 Divert All Calls+

GSM-R user procedures (cab radio Version 2)

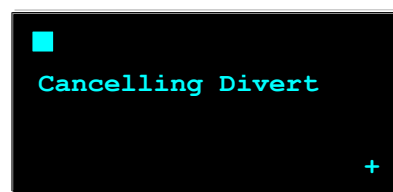
You will be presented with two options
"1 Deactivate", press tick to select it and
deactivate the call divert.



"2 Change number" press tick to allow a diverted
number to be changed when call divert is already
on.



This display appears for 5 seconds before clearing.



GSM-R user procedures (cab radio Version 2)

9.10 Cab radio error messages

Whilst using the GSM-R cab radio you may encounter certain failure or error messages. Table 4 explains the meaning of these messages and, identifies possible causes and potential solutions.

Displayed message	Meaning	Possible causes	Solution
Battery low	The back-up battery is being charged following discharge through use.	The battery back-up was used and has become discharged.	The back-up battery will charge when power is again available, no action is required by the driver. Press Text button at the end of the journey to check the battery is ok.
Busy	A dialled phone number is busy with another call.	The phone number dialled is busy.	Try again later.
	Or (if in a group call), it shows that another person in a group call is speaking.	The PTT button has been activated in a group call when another driver is speaking.	Keep trying (releasing and reactivating the PTT) until you can speak. Wait for the speaking driver to finish by saying "Out".
Divert not cancelled	An attempt to deactivate 'Divert All Calls' has failed.	There are a number of possible causes mainly relating to communication between the cab radio and the GSM-R network.	Try again.
DSD failed	An attempt to send a DSD alarm message has failed.	The DSD message failed to reach the person it was meant to.	Not necessary as the message is a reminder.

GSM-R user procedures (cab radio Version 2)

Displayed message	Meaning	Possible causes	Solution
Cab Radio Fault	Communications between the control panel and the GSM-R cab mobile is broken.	This fault shows when power is being supplied to the cab mobile and the drivers control panel and the communications link between the two has been broken. Likely to be an electrical fault.	Treat in accordance with the rules as a defective radio. Inform maintenance.
RAM Test Failure or EPROM Test	Start up failure of drivers control panel.	Same as above but tested on initialization.	Treat in accordance with the rules as a defective radio. Inform maintenance.
Failed	An attempt to send the standing at signal operational text message has failed.	There are a number of possible causes mainly relating to communication between the cab radio and the GSM-R network.	Try again, if the message fails for a second time, then you must remind the signaller of the presence of your train using an alternative method, for example a point-to-point call.
Failed to activate	An attempt to activate 'Divert all calls' has failed.	A phone number that was not valid was entered for the forwarded calls. The network failed to set up the divert.	Do not use "Divert all calls".
Failed to connect	A call, from the cab radio, could not be made.	There could be several reasons for this however the cab radio cannot tell what the problem is.	Clear the failure message and try again.

GSM-R user procedures (cab radio Version 2)

Displayed message	Meaning	Possible causes	Solution
Failed to terminate	You have failed to end an ongoing call.	There could be several reasons for this however the cab radio is not able to distinguish between them.	Press the cancel (X) button once to clear the failure message and again to try to clear the call.
Not lead driver (Multiparty calls)	A driver, other than the lead driver on a train with more than one driver registered has tried to make a multiparty call to the other drivers, which is not allowed.	As shown to the left.	Action not allowed. Only the lead driver can set up a multiparty call.
No other drivers (Multiparty calls)	A driver has tried to make a multiparty call to other drivers on a train where there are no other cab radios registered.	Driver 2 has not yet registered.	Wait and retry when driver 2 has registered.
No PA Attached	A user-initiated test (from the test menu) has failed to find the PA system.	There is no PA system attached.	Do not attempt to test the PA.
Radio failure:	During self-test or background testing the cab radio has detected a fatal failure.	A number of possible causes.	Attempt to re-boot the radio by tripping and resetting the GSM-R MCB.
Registration failed	The registration attempt has failed.	There are several reasons why registration may have failed depending on the circumstances.	See section 9.3.1 and following examples below.

GSM-R user procedures (cab radio Version 2)

Displayed message	Meaning	Possible causes	Solution
		Train reporting number mis-typed Wrong signal number used Special '99x' location code should have been used.	Repeat registration process.
		Train is not occupying the track circuit associated with the location code entered	Move train up to signal (with signaller's permission); or Register when standing at next suitable signal with the new 3- digit location code, or Register using '99x'.
		Associated train description is not contained in the signalling system. Signaller or Automatic Route Setting system yet to enter train description into the system.	Repeat registration process closer to departure time or check with signaller whether/when description has/will be entered.
		GSM-R has not fully deregistered the previous journey due to a system error	Repeat deregistration process. If repeat attempts fail, contact the signaller. If signaller sees 'nD' against previous head code. Driver will not be able to register.

GSM-R user procedures (cab radio Version 2)

Displayed message	Meaning	Possible causes	Solution
Registration failed Duplicate	Registration code is already in use by another cab radio.	Wrong registration code entered. Number genuinely already in use.	Check correct headcode and location code has been used. Repeat registration process using wild card location code supplied by signaller.
Registration failed xxxxxxx PA	System failed to register the PA.	GSM-R has not registered the PA due to a system error.	Deregister and attempt to register again. Report fault to signaller.
No PA Reg'd	System failed to register the PA.	GSM-R has not registered the PA due to a system error.	No action required. This is a reminder at the bottom of the display having already attempted to deregister and register again as described in the previous section.
Deregistration failed	System failed to deregister from previous journey.	GSM-R has not fully deregistered the previous journey due to a system error.	Repeat deregistration process, and report fault to signaller.
PA Reg'd	The PA registration has failed to deregister.	GSM-R has not fully deregistered the previous journey due to a system error.	Attempt to deregister the 'stuck PA' by repeating the deregistration process. If this fails, the fault should be reported to the signaller as a deregistration failure.

GSM-R user procedures (cab radio Version 2)

Displayed message	Meaning	Possible causes	Solution
SG fail	A reminder that an attempt to send a Standing at signal message has failed.	This message is displayed when the earlier Failed message is removed from the display by the cab radio responding to another incoming message or call. This happens before the user has acknowledged the Failed message by clearing the display.	This is only a reminder message.
Unobtainable number	Shows that the number called cannot be reached.	The number dialled is not in use.	Dial again taking care to enter the correct number.
No phonebook	The selected phonebook is not loaded in the radio.	The phonebook is not correctly installed in the cab radio.	You can use the cab radio but you should report the fault to your operations control.
Warning	During self-test the cab radio has found a fault. The fault is not service affecting and the cab radio can still be used but might have to be limited in what it can do.	An attached system may be at fault.	You can use the cab radio but you should report the failure to your operations control.

Table 4 – GSM-R cab radio error messages